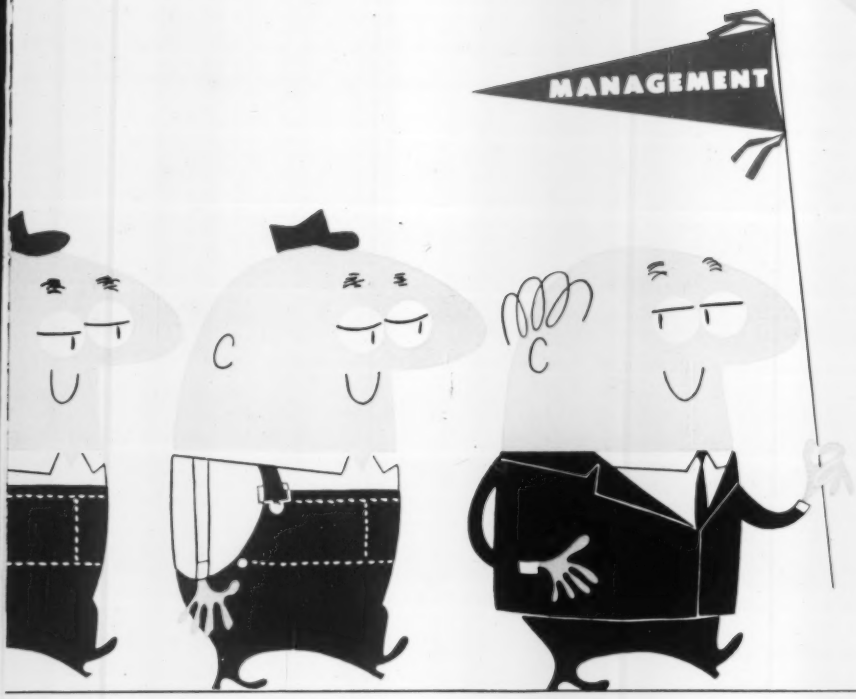
SEPTEMBER 16, 1957

A PROGRAM FOR MANAGEMENT
1957 . . . No. 8

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



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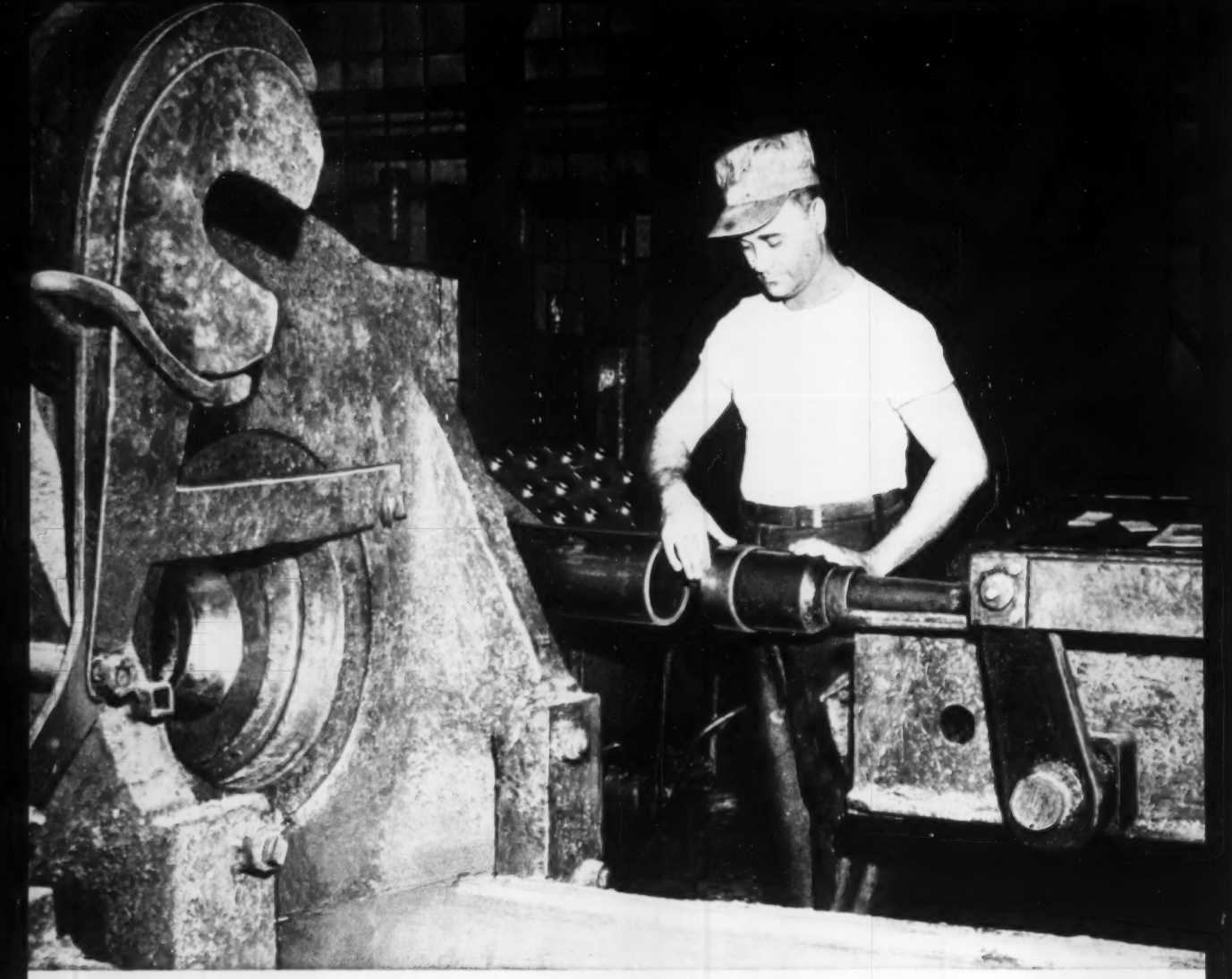


COLD-DRAWN TUBES AND BETTER FINISHES

One of the many reasons why tubing is cold drawn is to obtain a better surface finish than it is possible to achieve as a hot finished tube. In the finishing of tubing by the cold draw process, any imperfection of the die or the mandrel is reflected in the product. Pick up on the mandrel, for example, can mar the inside surface of the tube.

Louis Friedel operates one of the many cold draw benches at B&W. Between every draw, his practiced eye makes sure his mandrel and die are in perfect condition. Years of experience in watching and making thousands of feet of B&W Cold Drawn Tubing enables him to exercise that judgment needed to tell what meets B&W's quality standards.

Many other men like Louis Friedel, generations of experience armed with the best equipment, put their knowledge into every foot of B&W Tubing. It's your assurance that the B&W Tubing you buy will meet your most exacting requirements. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA-6045-G6

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels.

XXIII

This is the twenty-third of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Annealing: Its Uses with Alloy Steels

Broadly speaking, the primary purpose of annealing is to soften steel and make it more workable. Annealing, as applied to alloy steels, may be defined as a process that heats above, and furnace-cools through, the critical range at a controlled, specified rate of speed; or that heats to a point within, and furnace-cools to a point below, the critical range. In either case, the choice depends upon the structure and maximum hardness desired.

The first method produces a lamellar pearlitic structure, while the second creates a spheroidized condition. These will be discussed separately in the following paragraphs:

(1) *Lamellar pearlitic structure.* It should be mentioned at once that this structure can be obtained both as described above and by a modified method known as isothermal annealing. In the isothermal process, the steel is heated above the critical temperature (austenitized), then transformed at a predetermined temperature, which depends upon the analysis. This operation requires two furnaces or salt baths —one for austenitizing, one for transformation.

Lamellar pearlitic structures are generally associated with machinability in carbon ranges from 0.20 to 0.60 pct, provided the hardness does not exceed the optimum maximum Brinell numeral. This is especially true where critical tooling is involved. It is a very versatile structure, as it gives best results in such operations as broaching, tapping, threading, deep drilling, boring, milling, and tooling as applied on single- and multiple-spindle bar automatic machines.

(2) *Spheroidized structure.* There are two general fields of use for this type of structure when alloy steels are employed. In the low and medium carbon ranges, spheroidization is necessary for cold-shaping operations, such as heading, extruding, drawing. In the higher carbon ranges (over 0.60 pct), it is mandatory where machining is involved, because it tends to lower the hardness of the steel.

As noted elsewhere in this discussion, both lamellar pearlitic and spheroidized structures can be created through annealing. If you care for more details about these and other uses of annealing, and the results to be expected, by all means consult with our technical staff. Bethlehem metallurgists will gladly help you work out any problems. And when you are ready for new supplies of alloy steels, Bethlehem can offer the full range of AISI standard grades, as well as special-analysis steels and all carbon grades.

If you would like reprints of this series of advertisements from No. I through No. XX, please write to us, addressing your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. The first 20 subjects in the series are now available in a handy 36-page booklet, and we shall be glad to send you a free copy.

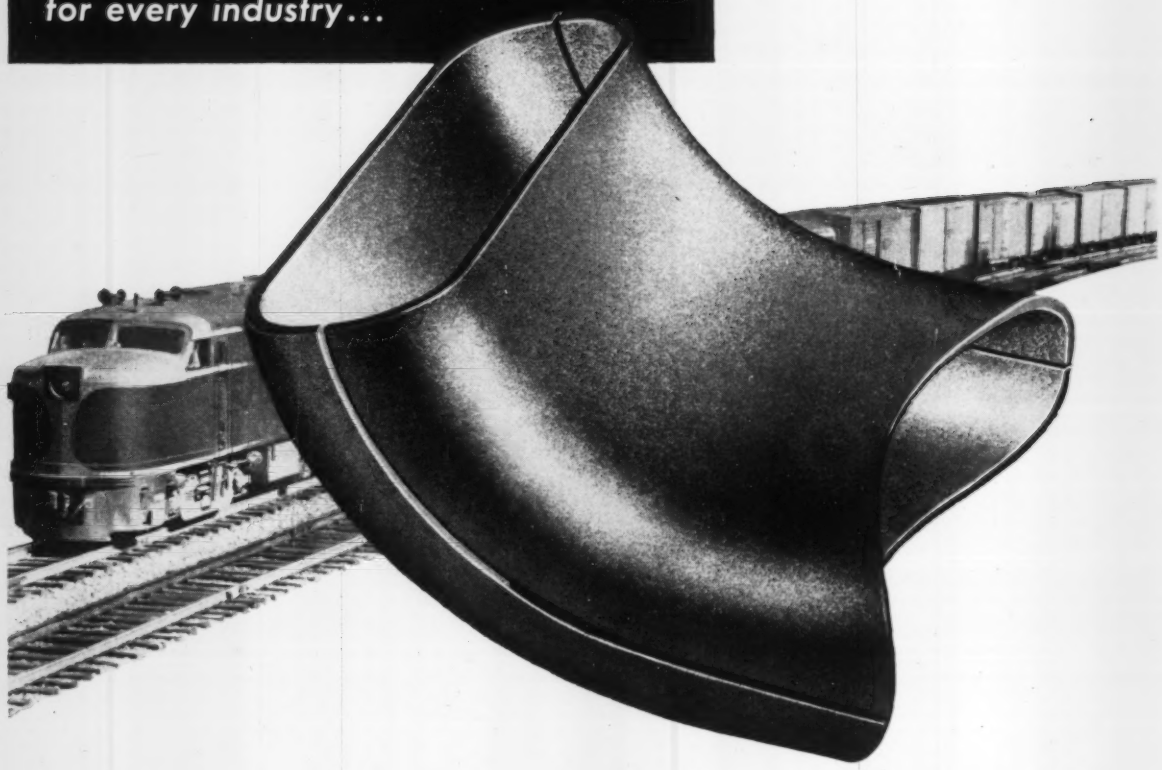
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

COMMERCIAL *Custom Stamping*
for every industry...



Cuts material costs 50%!

By making it possible to switch from a forging made from hot rolled tubing at 15 cents a pound, to a stamping made from mild flat steel at 6 cents a pound, Commercial has been able to effect a substantial saving for a leading manufacturer of diesel locomotives.

AN EXHAUST ELBOW TUBE is the part in question. There are 32 of them on each 16-cylinder diesel engine. Commercial makes two open stamping for each elbow, which are welded together automatically. Each half—stamped from 1/4-inch flat steel—is held to rigid tolerances of +0 −1/32. The ends need no trimming either, and fit both the engine block opening and manifold to which they are welded, right on the button. Now, strong, even welds with full penetration are routine.

UNUSUAL FORMING PROBLEMS like this one—in every industry—are routine at Commercial. The skill of Commercial engineers, plus Commercial's "die-bank" of over 2300 basic die components, may be just the cost-saving solution you need for your component forming problem. You can make Commercial prove it —without cost or obligation—by simply sending along a blueprint, sketch, or even sample of the part you are now making or plan to make.

Address inquiries or requests for forming engineering assistance to The Commercial Shearing and Stamping Company, Dept. L-38, Youngstown 1, Ohio.

SPECIALISTS IN CUSTOM FORMING THROUGH STAMPING • UPSET FORGING • HYDROSPINNING

COMMERCIAL
shearing and stamping

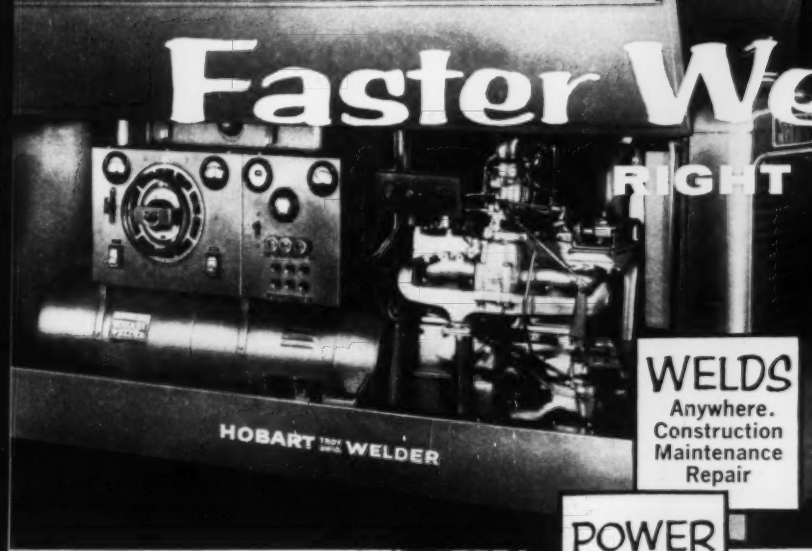
Faster Welding

RIGHT ON THE JOB

...nets extra savings and

MORE PROFITS FOR YOU!

TAKE IT TO THE JOB
USE YOUR OWN MEN
DO YOUR OWN WELDING



WELDS
Anywhere.
Construction
Maintenance
Repair

POWER
to run
Tools, Lights,
Motors

HOBART TROY OHIO WELDERS

A size and type to meet every welding need

Remote Control
•
Self-starting
•
Built-in Idling Device
•
110/220 Volt Outlets
•
. . . and many other convenience "extras"

No more delays waiting on outside help for welding or power to run tools, lights, motors, etc.—or the extra cost of getting jobs done.

With this new Hobart, you can have your own welder, power combination and use your own men to do the work right on the job.

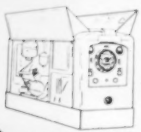
This self-starting Hobart Welder is easy to use and ready on a moment's notice to go to work for you on building construction, temporary contract work or on those RUSH jobs. Speeds production on all types of metal fabrication and eliminates costly delays and expensive replacement parts on maintenance and repairs.

There's always work that calls for welding and there is always more profit in the jobs when you do your own welding.

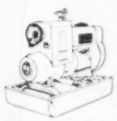
Why not get the latest information on this new type welder — no obligation. Simply write HOBART BROTHERS CO., Box ST-97, Troy, Ohio, or 'phone FE 2-1223.

"One of the world's largest builders of arc welding equipment."

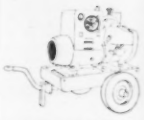
Gas Engine Drive



(1) Water Cooled



(2) Air Cooled



(3) AC Weld/AC Power

Electric Motor Drive

(4) Elec. Drive

(5) Bantam

Transformer and Rectifier

(6) DC Rect.

(7) AC Trans.

(8) AC/DC

IT'S EASIER AND FASTER TO Use On All Types Of Mild Steel

HOBART'S NEW *All-Position Iron Powder Electrode*

Now you can get faster welding with the new electrode that has the ability to weld with higher heats. Requires no special technique and lets you get up to 30% higher deposition. Be sure to try this Hobart "ROCKET 14."

HOBART BROTHERS CO., BOX ST-97, TROY, OHIO

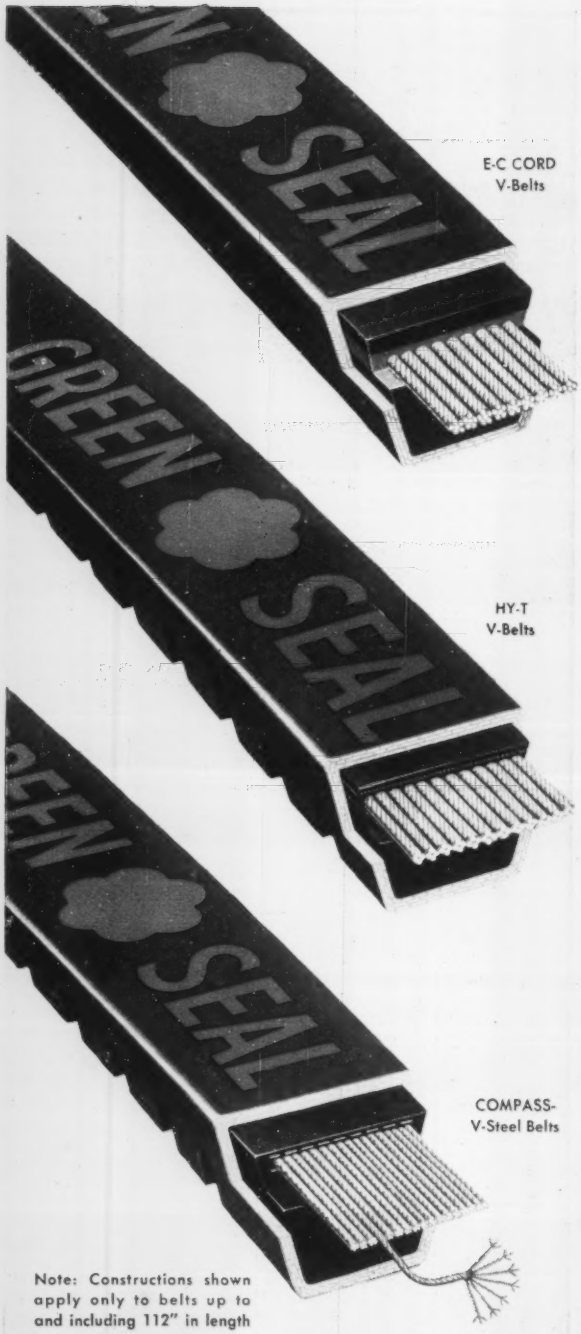
☐ Without obligation—send complete information on the new HOBART WELDER-POWER COMBINATION.

Would also like details on: 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐
☐ IRON POWDER ELECTRODES

*Name*_____

*Firm*_____

*Address*_____



Note: Constructions shown apply only to belts up to and including 112" in length

Why V-Belts with the Green Seal?

The Green Seal is put on each Goodyear multiple V-Belt for *your* protection. For it's your sign of a belt with dimensional stability—something long sought but only recently achieved in a complete line of V-belts.

What does dimensional stability mean to you? It means belt length remains the same from factory to drive. The length you order is the length you get. Matched sets stay matched. And mismatching—the biggest problem in belting multiple drives—is now a thing of the past.

How was this dimensional stability achieved? Until recently, stable belt length was possible only with steel cable load carriers as developed by Goodyear. But now it is also accomplished with synthetic cord through the exclusive Triple-Tempered 3-T process that stabilizes length by careful tempering with Tension, Temperature and Time.

Triple-Tempering also gives you a stronger, more shock- and stretch-resistant belt. Add "balanced construction"—with each component of the belt designed to its job—and you have a smoother-, longer-running belt which means maximum, trouble-free horsepower hours at minimum cost.

DIMENSIONALLY STABLE V-BELTS with the GREEN SEAL by

GOODYEAR

THE GREATEST NAME IN RUBBER

The Goodyear Tire & Rubber Company, Dept. 794, Akron 16, Ohio

Please send me more information about how V-Belts with the Green Seal solve the major problem in belting multiple V-belt drives.

Name_____

Company_____

Street Address_____

City_____ **Zone**_____ **State**_____

Compass, E-C Cord, Hy-T, Green Seal—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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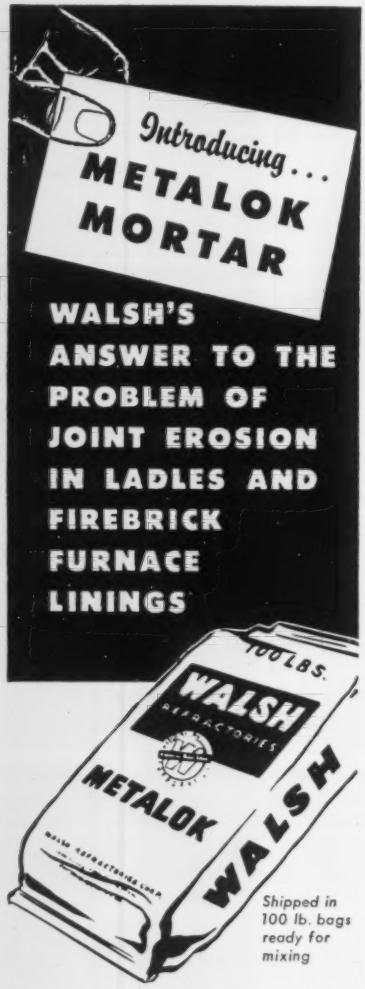


Shipped in 100 lb. bags ready for mixing

Used in laying up Walsh Ladle brick, Metalok successfully retards penetration of metal and slag... reduces joint erosion to the barest minimum — definitely increases ladle lining life.

For greater satisfaction and improved service in slab, reheat and other metallurgical furnaces, get acquainted with new Metalok. A trial will convince you. Write today for the complete money-saving story.

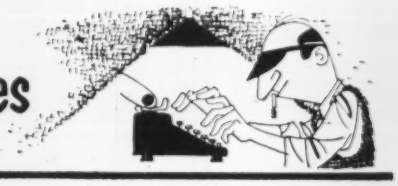
Specialists in Refractories of High Bulk Density and Low Porosity

WALSH REFRACTORIES CORPORATION

101 FERRY ST. · ST. LOUIS 7, MO.

FOR OVER 60 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES

behind the scenes



Leadership, Old Style

Those three little men strutting across this week's cover point up a subject that goes back a fur piece: Leadership, and dealing with workers. When Tom Bryan, the artist, was asked to make a cartoon illustrating the idea, he came up with three characters who used to supply his folks with drinkin' whisky in West Virginia.

Management is the logical leader of its people, but during the last couple of decades the unions have moved in, and management has moved back. Unions reached for leadership by shouting that management thought only in terms of production, and never of human beings; management replied that unions thought only in terms of dues, and never of the workers' welfare, and you guessed the rest: The guy in the middle is really confused.

This little guy has always had a rough time, whether he was producing pyramids, cathedrals, or jets. He was measured in days gone by as today, by what he could produce, but now he has shorter hours, more pay, better tools, and finer prospects. (See Page 119 for the Program for Management article.) In ancient Egypt the formula for measurement was simple: Produce or else. Nothing indicates this better than a page from an Egyptian manuscript found by a faithful Hussar attached to Napoleon's Nile expeditionary force. This celebrated sheet of hieroglyphics found its way to the flea market in Paris, where it was purchased by a school teacher from Wapakoneta, Ohio, who had a nephew who was nuts about secret ciphers. His translation follows:

Dear Diary

"I, Hole-in-the-Head, strawboss of 50 slaves on the Kufu Construction Project, this day saw the placement of 20 blocks of red granite. Found angular error. To forestall repetition, prayed to Set and threw four masons to crocodiles . . .

"Placed 18 blocks of red granite today. Workmanship lousy. High priest says I lack qualities of leadership. Threw four workers to crocodiles, and placed the rest on double shift . . .

"Production dragging terribly. Barely managed to set 15 blocks. To nip slowdown, tossed four masons to crocodiles and ordered remaining workers to work right around the water clock. High priest in charge of crocodiles insists on fat men, but there are no fat men here at Kufu except the overseers . . .

"Twelve blocks of red granite moved into position today. I, Hole-in-the-Head, strawboss of 38 slaves, may be obliged to revise notions of leadership, or initiate program to train crocodiles . . ."

Are You in Voice?

Many STEEL readers may not be aware of it, but the week starting today has been designated as Rock 'n' Roll Week, Anthracite Week, and National Sweater Week. The purpose of the singular observances is to: 1. Perpetuate the ideals (gulp!) of rock 'n' roll music. 2. Promote the use of anthracite in the eastern states. 3. Bring to public attention the advantages of sweaters. It would be difficult to celebrate a more diverse set of subjects, so let's all sing:

We're gonna rock, rock, rock,
We're gonna rock 'n' roll all night,
While the Scranton cats are diggin'
In the solid anthracite.
And while the mines
Are growing wetter,
Those Scranton cats
Should wear their sweaters.

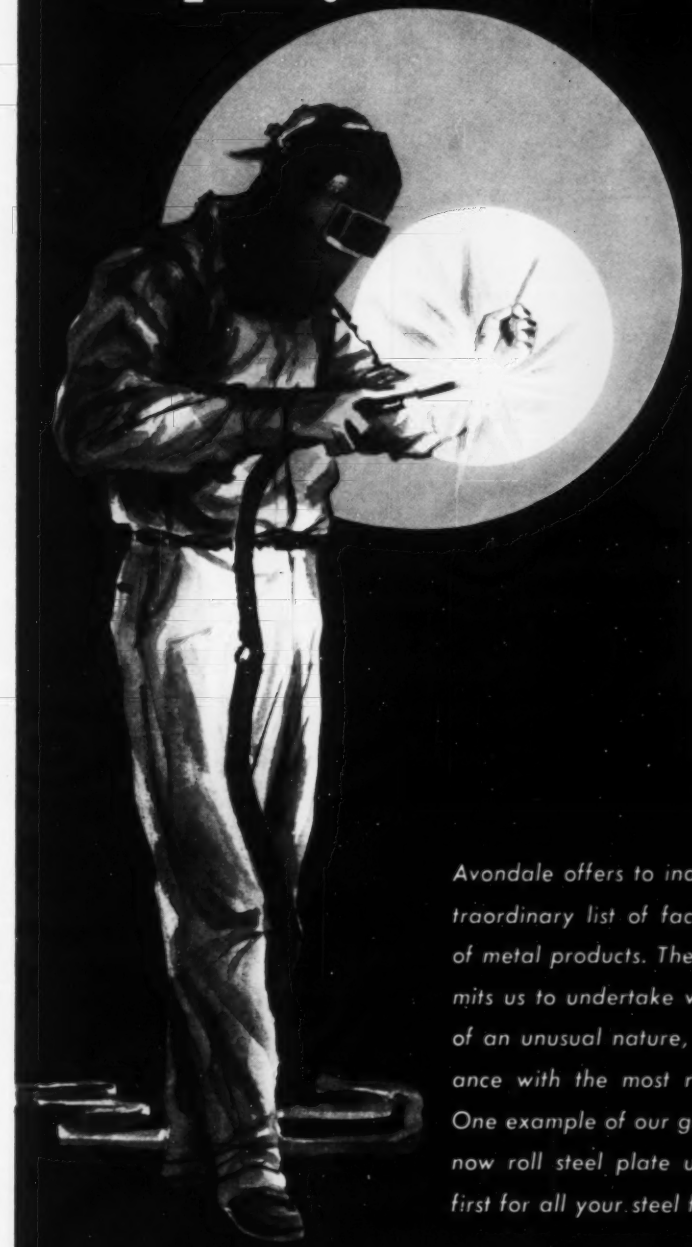
Oops!

In talking about appliances last week, we got so carried away by Ben Franklin's dangerous experiments with electricity that we forgot one important point, to wit: The cover on the Sept. 9 issue shows a picture of a washing machine innards. Frigidaire went to the trouble of dismantling and photographing the parts of one of its 1958 models. Our belated thanks to the General Motors division.

Shrdlu

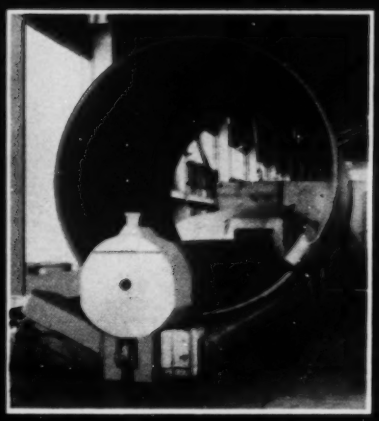
(Metalworking Outlook—Page 73)

Capacity greater than ever before for



SPECIALIZED STEEL FABRICATION

AVONDALE



Avondale offers to industry as a whole a complete and extraordinary list of facilities for the fabrication of all types of metal products. The quality and range of equipment permits us to undertake work of all standard, as well as work of an unusual nature, and to perform such work in accordance with the most rigid specifications and requirements. One example of our greater capacity is the fact that we can now roll steel plate up to 4 1/2 inches thick. See Avondale first for all your steel fabrication needs.

a b i l i t y • i n t e g r i t y • c a p a c i t y

SHIP BUILDING · SHIP REPAIRING · FOUNDERS · PROPELLERS · STRUCTURAL STEEL

AVONDALE MARINE WAYS, INC. CABLE ADDRESS "AVONWAYS"

P. O. BOX 1030 • PHONE UNiversity 6-4561 • NEW ORLEANS 8, U. S. A.

BEHIND THE GLAMOR, WEIRZIN® RUST PREVENTION

Production *and* product bonuses are all yours with Weirzin electrolytically zinc-coated steel, as many a manufacturer is finding out.

Take Farrington Manufacturing Co., Needham Heights, Mass., for instance—makers of jewel cases, display boxes and metal radio cabinets. "We make the shells for our cases and boxes out of Weirzin," a spokesman reports. "Its zinc coating prolongs the life and beauty of our Texol® covering materials because it retards rust formation which would cause surface irregularities. Interior rust stains in our delicate satin and velvet lining materials are eliminated. Furthermore, our adhesive bonds better to Weirzin than to plain steel.

"In the matter of die life, we have substantially increased our production of shells between grinds, thanks to the lubricating action of Weirzin's zinc coating."

Weirzin's zinc coating stands up under the most punishing fabrication steps, too. Won't chip, flake, peel; ends costly re-coating of steel parts after fabrication. And *chemically treated* Weirzin takes paints, enamels, lacquers and lithograph inks beautifully; holds them better than any other form of steel; eliminates underfilm corrosion. Investigate Weirzin's superior steel fabricating qualities and flawless rust prevention.

Write Weirton Steel Company, Dept. B-12. Weirton, West Virginia, for free illustrated booklet—"Weirzin."

WEIRTON STEEL COMPANY

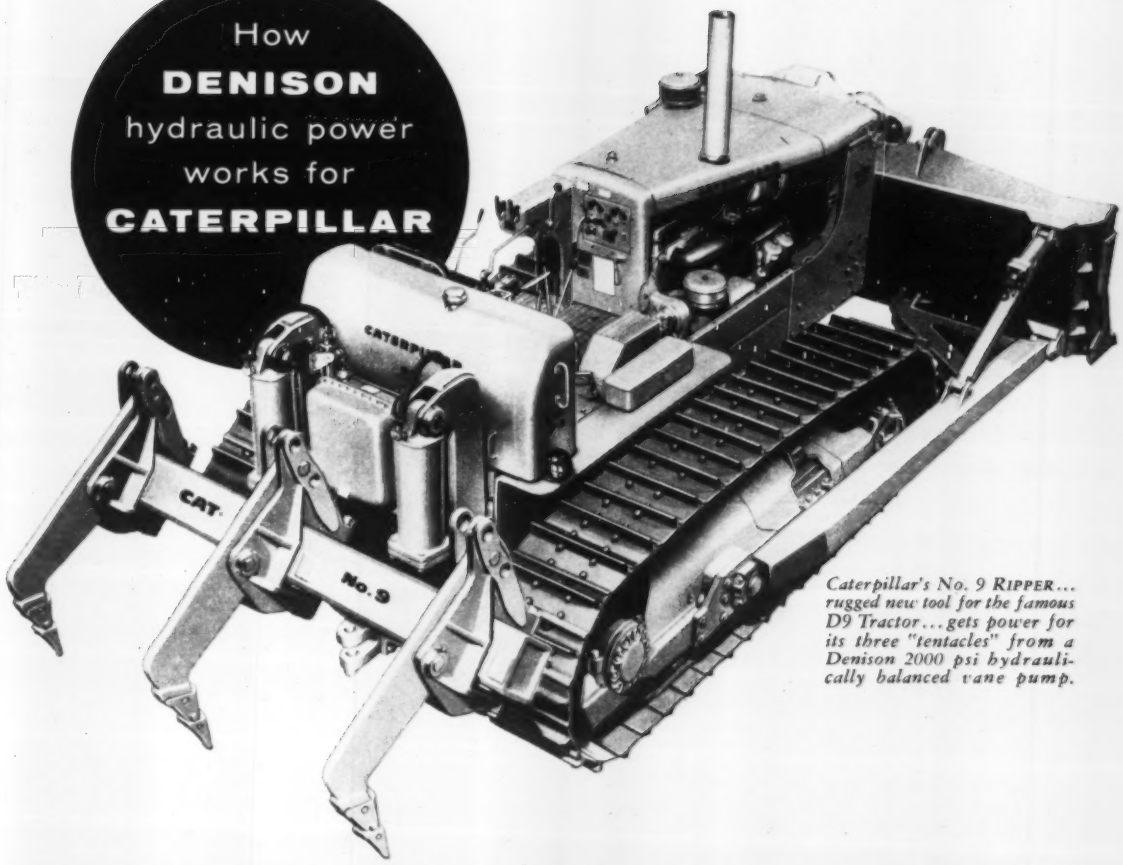
WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

How **DENISON** hydraulic power works for **CATERPILLAR**



Caterpillar's No. 9 RIPPER... rugged new tool for the famous D9 Tractor... gets power for its three "tentacles" from a Denison 2000 psi hydraulically balanced vane pump.

PUTTING TEETH IN THE "RIPPER"

...another application for DENISON hydraulic power

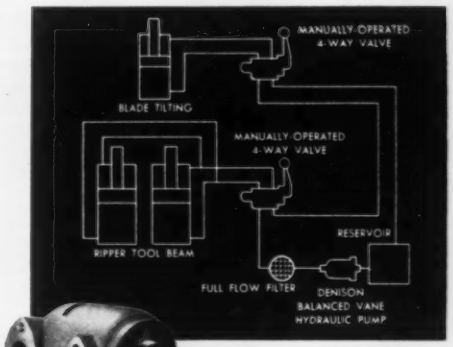
Caterpillar's rugged No. 9 Ripper—newest tool designed for their powerful D9 Tractor—proves again the basic design advantages of Denison's 2000 psi vane-type hydraulic pump.

The Ripper's three working shanks are powered by the Denison "T" series pump—capable of delivering up to 2000 psi continuously. Driven by the engine power take-off, the Ripper's pump actually operates at 1450 psi (relief valve setting) which provides generous reserve stamina to withstand heavy workloads with no danger of breakdown. With the Denison "T" series pump, Caterpillar designers assured the owner of cold-weather pump-starting ability without damage to the pumps. They assured speedy servicing in the field because the complete pumping cartridge is removable as a unit. It all adds up to *lower operating cost* and dependable performance.

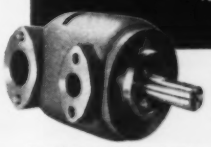
There's less weight, less cost-per-horsepower—with smaller lines and valves with the Denison 2000 psi pump as the heart of a hydraulic system. Design flexibility is unlimited.

Have your Denison hydraulic specialist tell you more about the 2000 psi pump—and help you with any equipment or machinery design problem. Write Denison Engineering Division, American Brake Shoe Co., 1180 Dublin Road, Columbus 16, Ohio.

DESIGNERS—ENGINEERS! New Bulletin 201 describes "How to Design More Efficient Hydraulic Power Into Mobile Machinery." Write us.



Circuit drawing illustrates hydraulic system for powering Caterpillar's new No. 9 Ripper.



Denison 2000 psi vane-type hydraulic pump.

HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

DENISON HydrOILics

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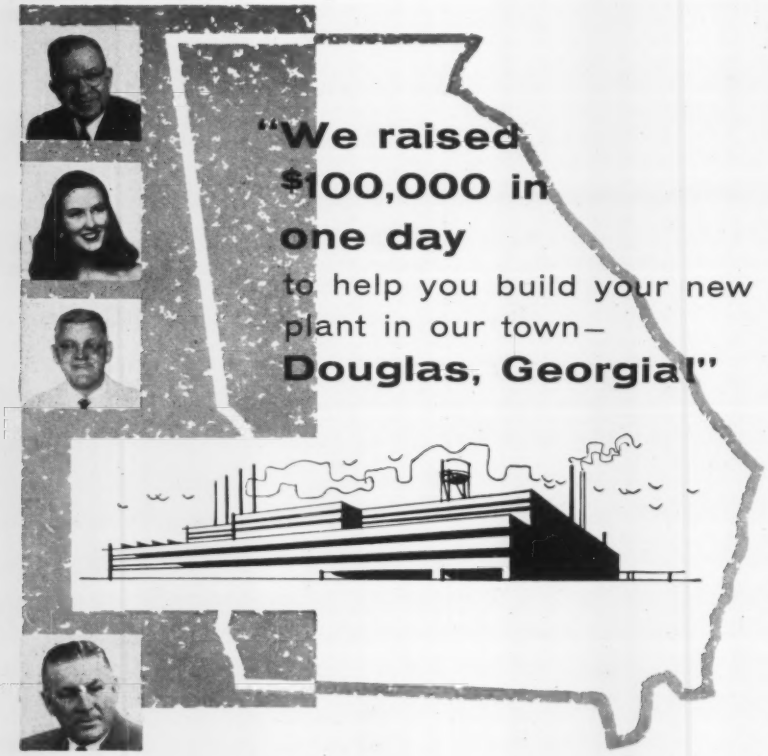

$100,000 in the first day! That's what the 8,200 people of Douglas pledged to help new industry settle in Georgia—a remarkable feat for so small a town but typical of the vitality which marks Georgia's economic progress!

Douglas will *now* finance a new plant up to 100,000 sq. ft. This financial aid, however, is only one of Douglas' prime assets. A readily available labor force (59,000 population in a 25 mile radius) is willing to work and easily trainable. A model Urban Renewal Plan, one of two in the nation backed by Federal aid, has been initiated. Eight buildings, 14,000 to 200,000 sq. ft., and numerous sites are available. Beyond this Douglas has the basic advantages of Georgia: excellent transportation, low cost power and water, mild climate, a central location among major southeastern markets!

The people of Douglas and Georgia are working hard planning how best to put their resources at your service. Join their profitable progress by locating in Georgia! Call, wire, or mail the coupon for details! All inquiries confidential.

Georgia Where Industry is Moving **Forward**

MAIL TODAY— PROFIT TOMORROW

Scott Candler
Secretary of Commerce
Georgia Department of Commerce
100 State Capitol
Dept. PDG-97
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Send me the facts about Industrial Georgia, especially concerning_____

Name_____ Position_____

Company_____

Address_____

This message sponsored jointly by: *The State of Georgia, and the Douglas, Ga., Chamber of Commerce.*

LETTERS TO THE EDITORS

Steel Price Study Available

Your item, "Economist Disputes Kefauver's Theories," in the Windows of Washington column of Aug. 19 (Page 114) was most interesting. It tells of Senator Kefauver's hearing on the steel price increase. Could you tell me where we could obtain a copy of Prof. Jules Backman's 200-page study you mention?

K. Ono
Marketing Research Section
Japan Steel & Tube Corp.
Tokyo

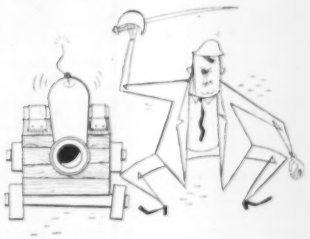
• *A limited supply is available from: John Munhall III, U. S. Steel Corp., 1625 K St. N.W., Washington 6, D. C.*

Appreciates Reprint Service

In the Aug. 19 issue, I read the interesting article, "What Glass Can Offer Metal" (Page 154). I would like an additional copy for my reference. I appreciate this service.

Douglas W. Hamm
Director of Product Engineering
Muskegon Piston Ring Co.
Muskegon, Mich.

Guard Against Corrosion



I read with interest the article, "New Ways To Fight Corrosion" (Aug. 26, Page 68). Please send a copy of this article and a copy of Part II, scheduled for Sept. 2 issue.

H. M. Gruner
Metallurgical Engineer
Cold Rolled Products Div.
John A. Roebling's Sons Corp.
Subsidiary of Colorado Fuel & Iron Corp.
Trenton, N. J.

We would like a reprint.

A. W. Lancaster
Engineering Research
Dorr-Oliver-Long Ltd.
Orillia, Canada

15 Copies to Personnel Men

I was interested in the article, "Make Your Labor Pact Work" (Aug. 19, Page 118). May we have 15 copies so that distribution can be made to our personnel directors?

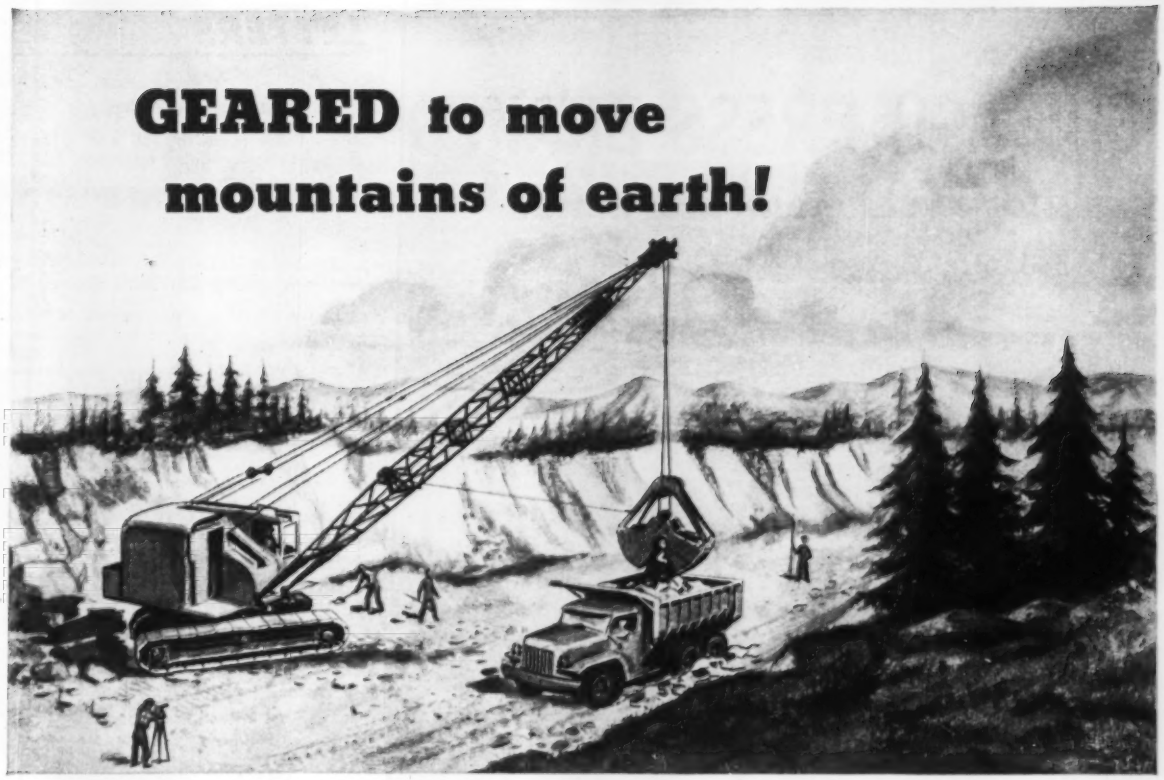
J. J. Regotti
Assistant Director
Employee & Labor Relations
Gould-National Batteries Inc.
St. Paul

Eager To Read Series

I would appreciate copies of your 1957 Program for Management series, articles No. 1 through 6. I have read No. 7, "Research: Threshold to the Future" (July 15, Page 93), and am eager

(Please turn to Page 12)

GEARED to move mountains of earth!



Sharp curves and steep grades used to be a part of almost any highway trip. But after the great new highway programs are completed, you will be able to travel nearly everywhere in our country with a greater degree of safety and comfort. Giant construction machines will move mountains of earth in building the sweeping scenic roads that will make up our national highway system.

Gears cut on Fellows Gear Shapers are important components of the machines that perform this herculean task. In an earthmover, for example, many tons of force must be transmitted smoothly and without failure. Often these heavy duty gears must be of large diameter and coarse pitch.* In any case, there are Fellows machines that can produce them accurately and rapidly.

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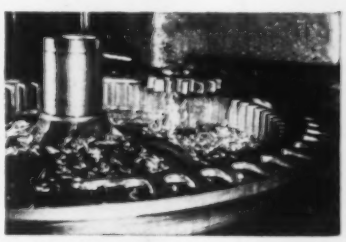
*For example, Thew Shovel Company of Lorain, Ohio produces this 73 tooth, 1.8235 D.P. internal gear on a standard Fellows 100-inch Gear Shaper. Gear is used in Lorain shovels and cranes.



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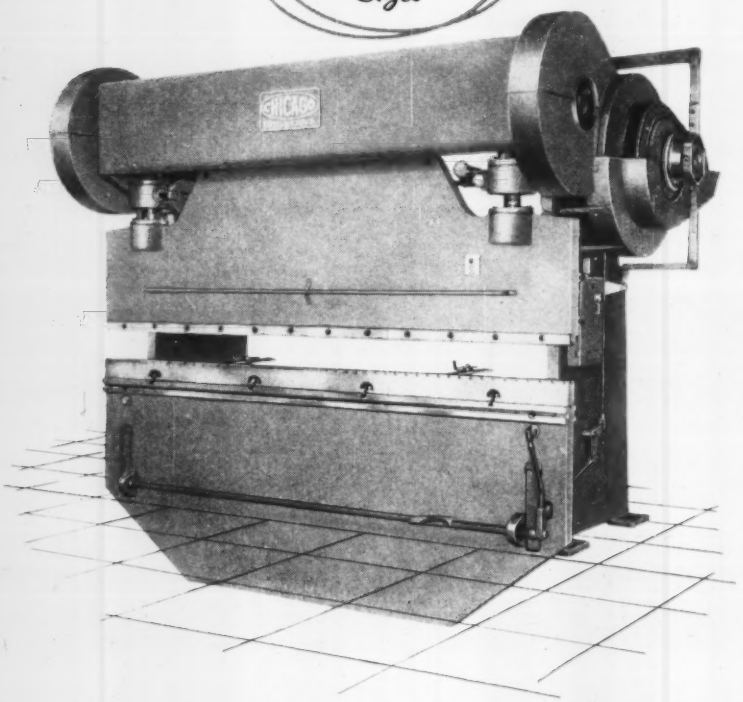

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LETTERS

(Concluded from Page 10)

to read the others in full and to have them on file for handy reference.

J. J. Linehan
Assistant Chief Engineer
Gerrard Steel Strapping Div.
U. S. Steel Corp.
Chicago

Metalworking Outlook Query

In the Metalworking Outlook of Aug. 19 (Page 101) is the item, "High Temperature Parts Developed." Will you please give us the source of information on the alloys cited?

D. K. McIlvaine
AED-Engineering
Small Motor Div.
Westinghouse Electric Corp.
Lima, Ohio

• *Write the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., and ask for the Office of Technical Services (Department of Commerce) publication, PB 121935, entitled, "Retainer Materials for Aircraft Gas Turbine Bearings."*

Article Is Eye-Opener

Please send a copy of your interesting eye-opener article, "Needed: More Marketers" (Aug. 5, Page 66).

K. F. Woods
Advertising Assistant
Sheffield Corp.
Dayton, Ohio

We would appreciate a copy of this interesting article.

F. W. Gledhill
Commercial Research
Consolidated Western Steel Div.
U. S. Steel Corp.
Los Angeles

Reader Wants Address

Please advise the address of the Hydroforming Co. of America. We have taken the firm name from the article, "Complex Shapes at Bargain Rates" (Aug. 12, Page 124).

B. A. Deibert
Purchasing Agent
Federal-Mogul Div.
Federal-Mogul-Bower Bearings Inc.
St. Johns, Mich.

• *The company's address is: 7400 W. Lawrence, Chicago, Ill.*

New Use for Glass?

Concerning your article, "What Glass Can Offer Metal" (Aug. 19, Page 154), have the possibilities of using glass coated draw dies in the production of deep drawn metal stampings been explored?

W. R. Melvin
Geo. W. Morris Co.
Racine, Wis.

• *Your letter is being referred to A. O. Smith Corp., Milwaukee.*

Useful to Product Planner

I should appreciate a copy of the article, "How To Aid Your Engineers" (Page 64) and "Research . . . Threshold to the Future" (Page 93), from the July 15 issue. These should be valuable to me.

J. H. Romney
Product Planner
Dresser Mfg. Div.
Dresser Industries Inc.
Bradford, Pa.

No Excessive Heating

New Rectifier Cooling System Prevents Heat Build-up and Damage

when ac Power Fails

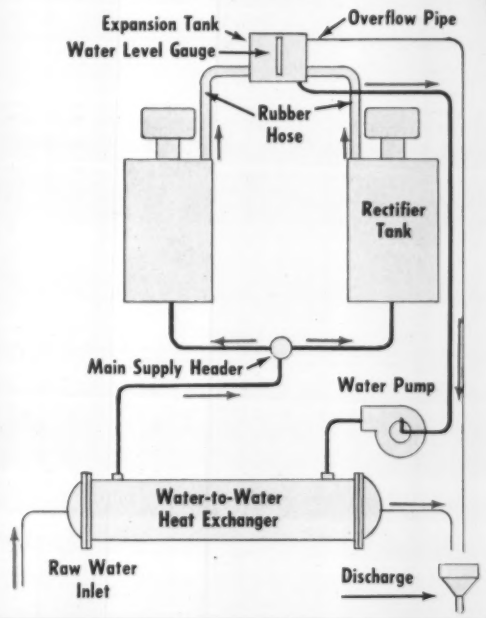
A SAFER, more effective cooling system in the Allis-Chalmers rectifier continues to circulate water *even when an ac power failure stops the water pump.* Heat and steam are dissipated before they can develop to the danger point.

The new system features an expansion tank that extends the full length of the rectifier frame with short vertical connections from each tube. With warm water continuing to flow freely upward, a thermo-siphoning action draws cooler water into the tubes. Build-up of excessive temperatures is prevented. Steam pockets are kept from forming. Subsequent water loss from the recirculating cooling system is minimized.

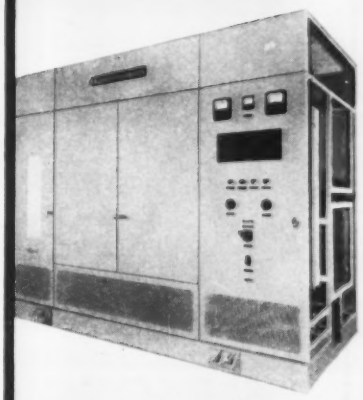
Successful operation in hundreds of installations is your assurance of the complete reliability of Allis-Chalmers mercury arc rectifiers. Contact your nearby A-C office or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

How the System Works

Water is normally pumped through the water-to-water heat exchanger to the main supply header from where it circulates through rectifier tubes picking up heat. Hot water flows up through the short connections to expansion tank and back down to suction side of water pump.



ALLIS-CHALMERS
Mercury Arc Rectifiers



Factory-packaged units cut installation time and costs. Sealed tube rectifiers are supplied in completely enclosed or open types. Here is a typical, completely enclosed, 1000-kw, 250-volt rectifier for steel mill service.

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A-C ALLIS-CHALMERS

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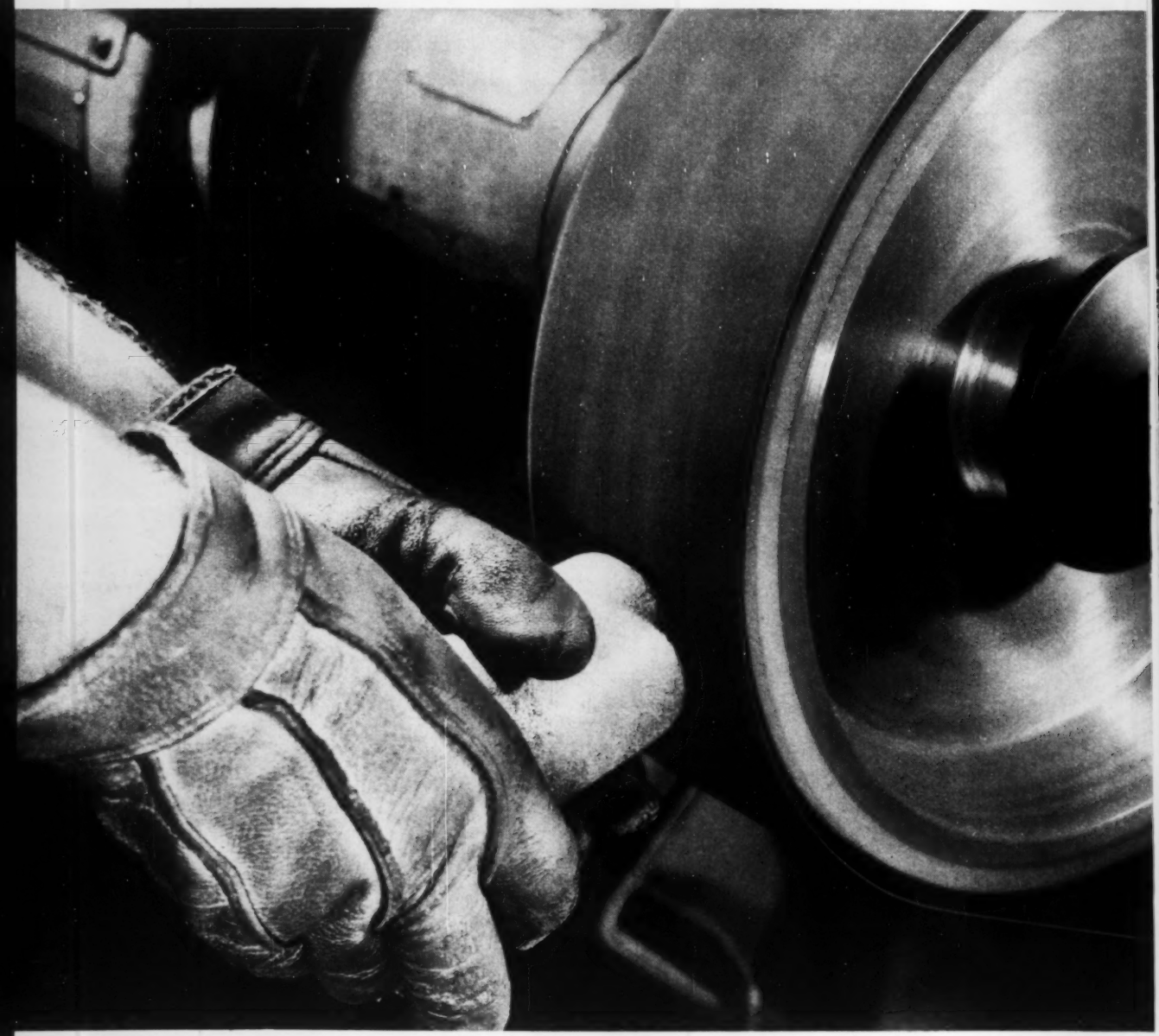

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"Abrasive Tech"—

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Company _____

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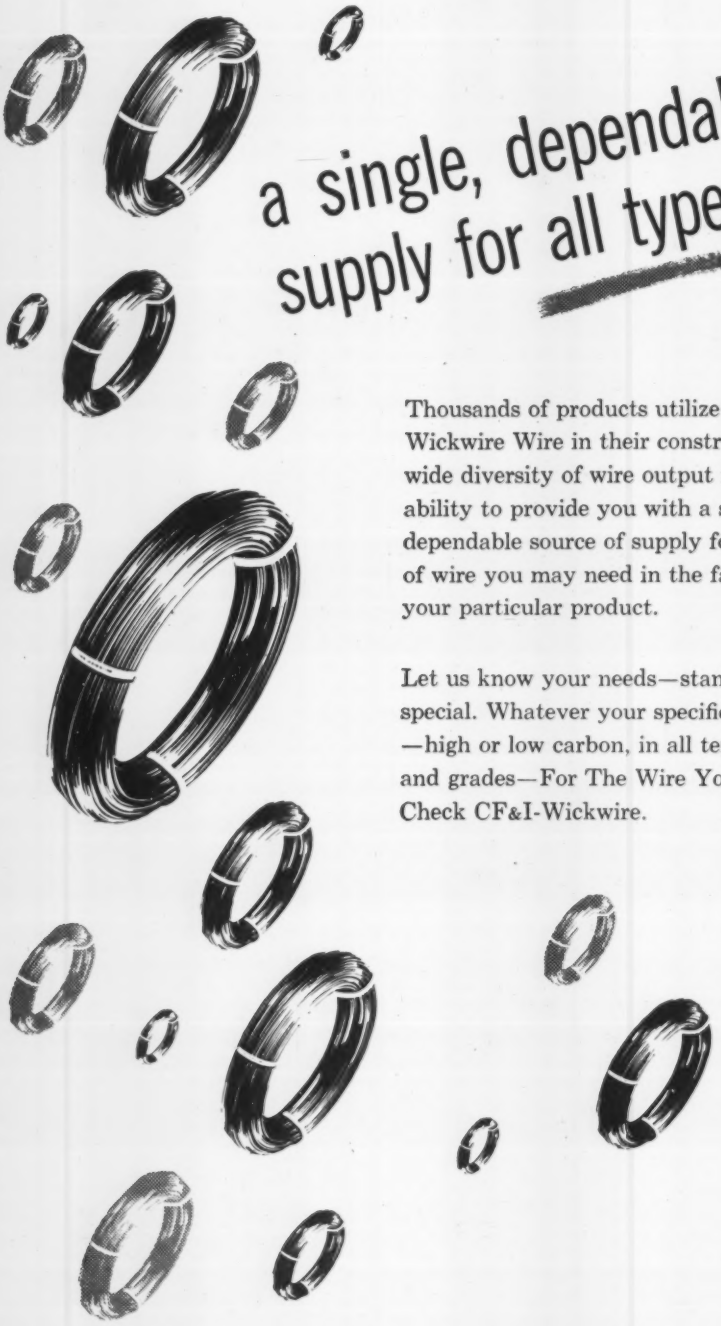

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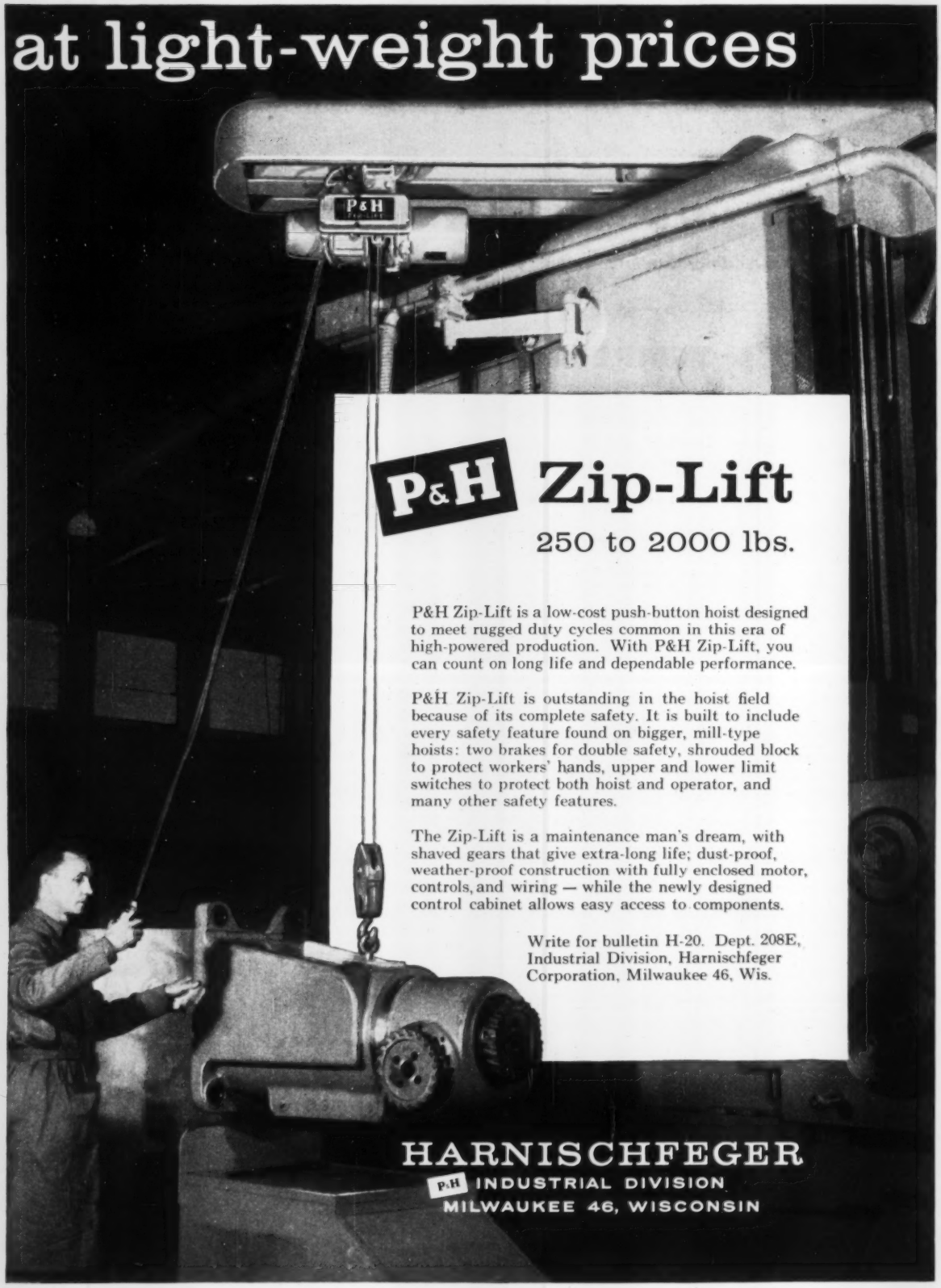

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CALENDAR
OF MEETINGS

Sept. 17-18, Electronics Industries Association: National technical machine tool automation meeting, Ambassador Hotel, Los Angeles, Calif. Association's address: 1721 DeSales St. N.W., Washington 6, D. C. Secretary: James D. Secrest.

Sept. 17-20, American Die Casting Institute: Annual meeting, Edgewater Beach Hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 18-20, National Industrial Conference Board: Marketing meeting, Waldorf-Astoria Hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Sept. 20, Malleable Founders' Society: Fall meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Sept. 21-24, Steel Founders' Society of America: Fall meeting, Homestead, Hot Springs, Va. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Secretary: George K. Dreher.

Sept. 22-24, American Machine Tool Distributors Association: Annual meeting, Hotel Cleveland, Cleveland. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelly.

Sept. 22-25, American Institute of Wholesale Plumbing & Heating Supply Associations Inc.: Annual meeting, Waldorf-Astoria Hotel, New York. Institute's address: 402 Albee Bldg., Washington 5, D. C. Executive secretary: George T. Underwood.

Sept. 23-25, American Society of Mechanical Engineers: Fall meeting, Hotel Statler, Hartford, Conn. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Sept. 23-26, Association of Iron & Steel Engineers: Annual convention, Penn Sheraton Hotel, Pittsburgh. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Sept. 26-27, American Hot Dip Galvanizers Association Inc.: Semiannual meeting, Netherland-Hilton Hotel, Cincinnati. Association's address: 1806 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.

Sept. 29-Oct. 3, National Screw Machine Products Association: Fall membership meeting, Broadmoor Hotel, Colorado Springs, Colo. Association's address: 2860 E. 130th St., Cleveland 20, Ohio. Executive vice president: Orrin B. Werntz.

Sept. 29-Oct. 2, Packaging Machinery Manufacturers Institute: Annual meeting, Cloisters, Sea Island, Ga. Institute's address: 342 Madison Ave., New York 17, N. Y. Executive director: Russell L. Sears.

Sept. 30-Oct. 1, Material Handling Institute Inc.: Joint industry fall meetings, Greenbriar, White Sulphur Springs, W. Va. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Oct. 1-5, Society of Automotive Engineers: Aeronautic meeting, aircraft production forum and aircraft engineering display, Ambassador Hotel, Los Angeles. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Oct. 3-4, Refractories Institute: Fall meeting, Grand Hotel, Point Clear, Ala. Institute's address: 1801 First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary: Avery C. Newton.

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TRU-STEEL®

Manufactured by

STEEL SHOT PRODUCERS, INC.

Butler, Pa.

Subsidiary of Pittsburgh Crushed Steel Co.

Pittsburgh 1, Pa.

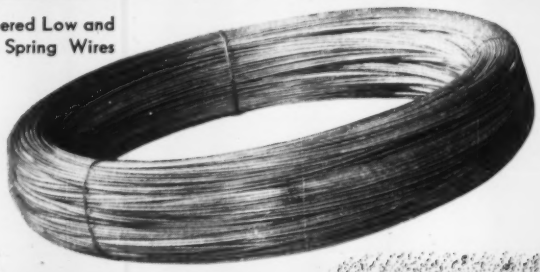
Sold by Pangborn Corporation, Hagerstown, Md., and by leading distributors of foundry supplies from coast to coast.

WASHBURN

FOR ROUND OR FLAT WIRE AND STRIP

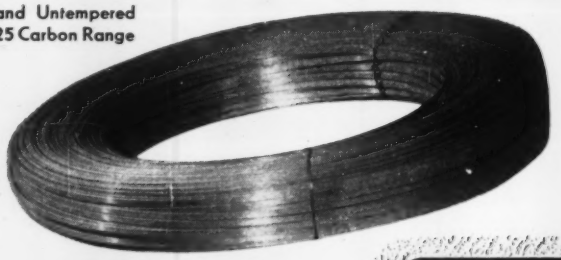
ROUND WIRE

Round Untempered Low and High Carbon Spring Wires



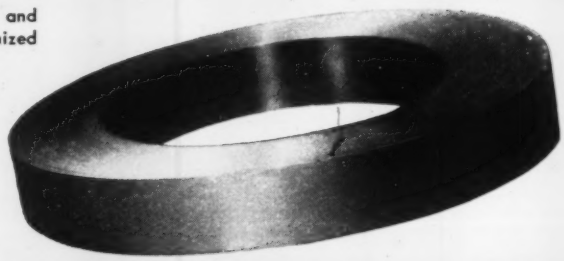
FLAT WIRE

Flat Tempered and Untempered Wires in .50 to 1.25 Carbon Range



FLAT STRIP

Flat Cold Rolled Strip 6" and Narrower, Bright, Galvanized and Cadmium Finish



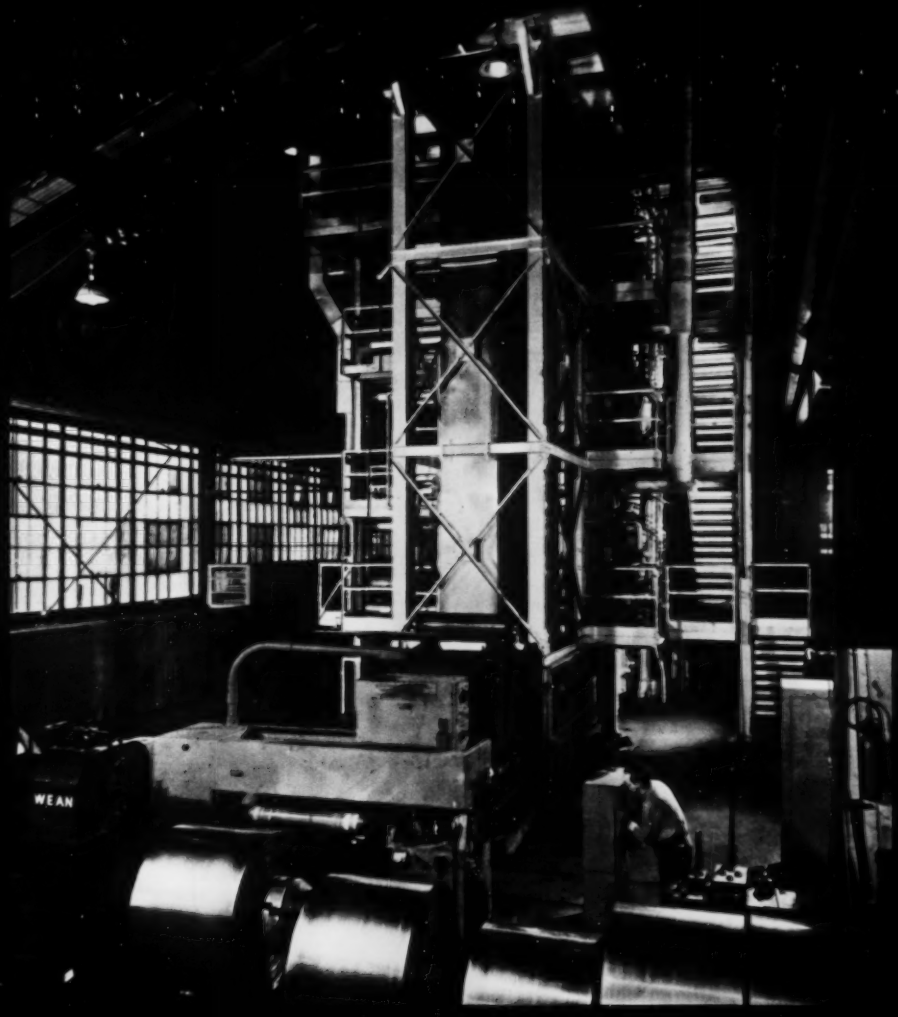
WASHBURN

WASHBURN WIRE COMPANY, NEW YORK CITY

CLEAN, UNIFORM BILLETS – STRIP – RECTANGULAR, ROUND, FLAT RODS

TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

Wean, Wheeling and Continuous Annealing



420

THE continuous strip annealing line above is functional proof of Wean Creative Engineering. Installed in Wheeling Steel's Yorkville (Ohio) plant in 1947, it is still maintaining uniform quality of product at high production rates.

A leading pioneer in the development of the continuous strip annealing process, Wean early realized its outstanding advantages; more uniform anneal . . . better surface uniformity . . . better metallurgical control . . . less cold rolling required for tempering. But perhaps most impressive is the fact that previous methods required thirty-six hours to anneal a 6,000 lb. coil. Today, a Wean Continuous Strip Line anneals the same coil in a matter of minutes.

Nine Wean Continuous Strip Annealing Lines have been built to date. Why not bring this vast experience to bear on your annealing problems.

THE WEAN ENGINEERING COMPANY, INC.

WARREN, OHIO

BISHOP TUBING

Can Take it!

That's why more and more aircraft, rocket and missile manufacturers are *specifying* BISHOP TUBING for engine parts and assemblies to withstand the corrosion, high temperatures, resistance to oxidation, vibration, stress and shock required by today's high speed aircraft.

Bishop Stainless Steel and Nickel Alloy Aircraft Grade Tubing excels in performance and endurance, and when required meets the rigid ASM, ASTM, MIL-T and AN-WW-T specifications.

You, too, can *specify* BISHOP TUBING on your next order.

Manufacturers of: Seamless and Welded and Drawn Stainless Steel Tubing (.008" to 1" OD), Mechanical, Capillary, Hypodermic and Aircraft Grade, Nickel and Nickel Alloy Tubing (up to .625" OD), Tubular Fabricated Parts, Glass-to-Metal Sealing Alloys, Clad Metals and Composite Wires, Platinum Group Metals and Chemicals. **Catalogs on Request**

JB

STAINLESS STEEL PRODUCTS DIVISION

J. BISHOP & CO. **Platinum Works**

Malvern, Pennsylvania Tel.: Malvern 3100

Photograph of F-102A Interceptor Courtesy CONVAIR, a division of General Dynamics Corp., San Diego, California.

Rust-Oleum is distinctive as your own fingerprint. Accept no substitute.

. . . goes on faster, stops rust, lasts longer over rust!

See complete catalog in Sweets.

ONE MAN often does the work of two!

EASIER TO USE—because Rust-Oleum 769 Damp-Proof Red Primer goes over rusted metal after scraping and wirebrushing to remove rust scale and loose rust—usually eliminating costly surface preparations. *Stops Rust*—because Rust-Oleum's specially-processed fish oil vehicle *penetrates* rust to bare metal—driving out air and moisture that cause rust.

LASTS LONGER applied over rust—and teamed up with Rust-Oleum's many attractive finish coatings, assures lasting beauty. Try Rust-Oleum on *your* tanks, metal sash, machinery, wire fences, stacks, girders—or around *your* home. Prompt delivery from Industrial Distributor stocks. Write for illustrated literature with color charts showing colors and applications.

RUST-OLEUM CORPORATION • 2513 Oakton Street • Evanston, Illinois

RUST-OLEUM®

30% GREATER COVERAGE—MANY ATTRACTIVE COLORS

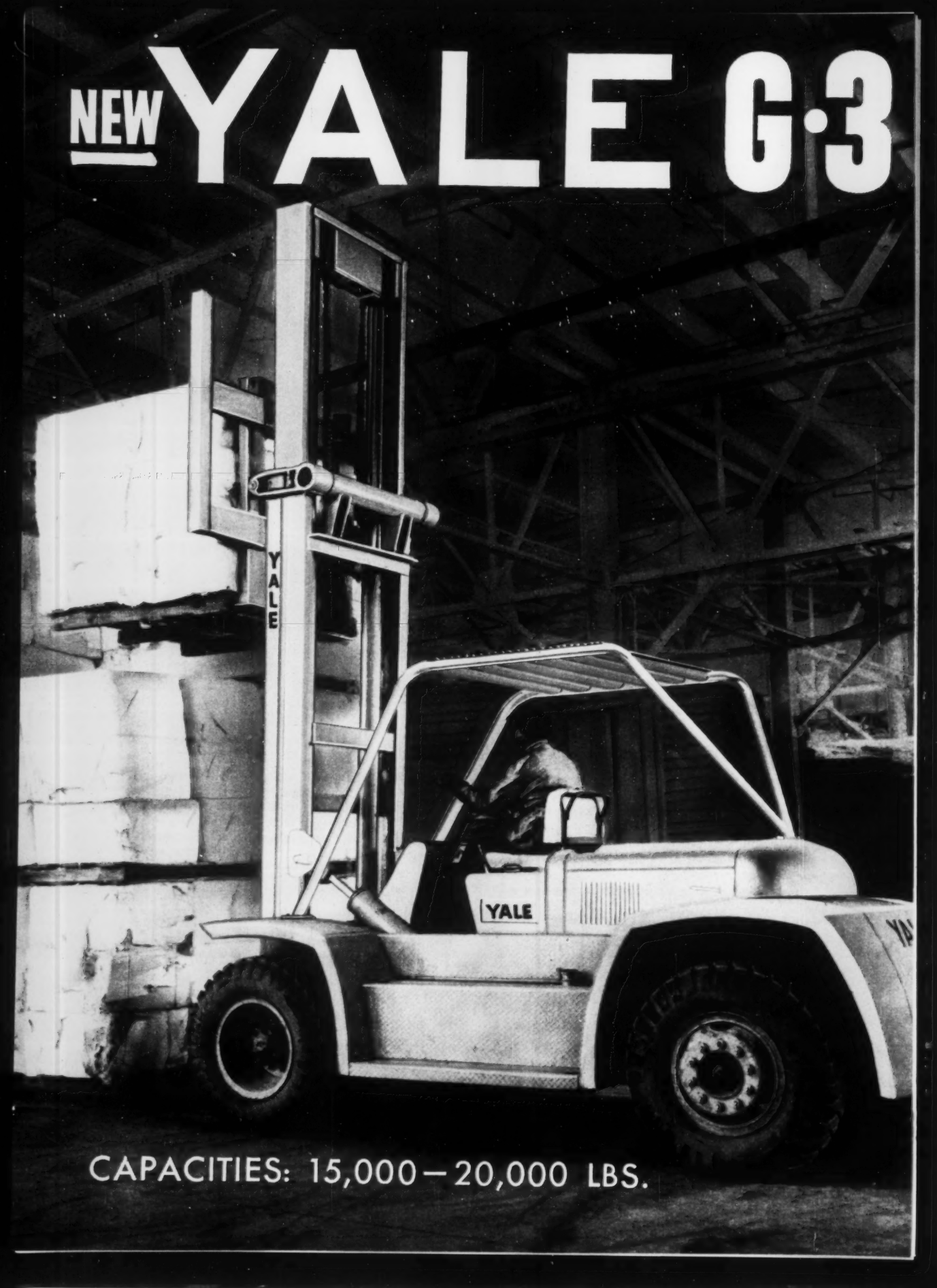
Rust-Oleum covers up to 30% more area, depending upon surface condition and porosity. And you can beautify as you protect with Rust-Oleum finish coatings in Aluminum, White, Red, Gray, Green, Blue, Yellow, Black, etc.

STOPS RUST!®

Rust-Oleum and Stops Rust are brand names and registered trademarks of the Rust-Oleum Corporation.

Write for special report showing Rust-Oleum penetration to bare metal.

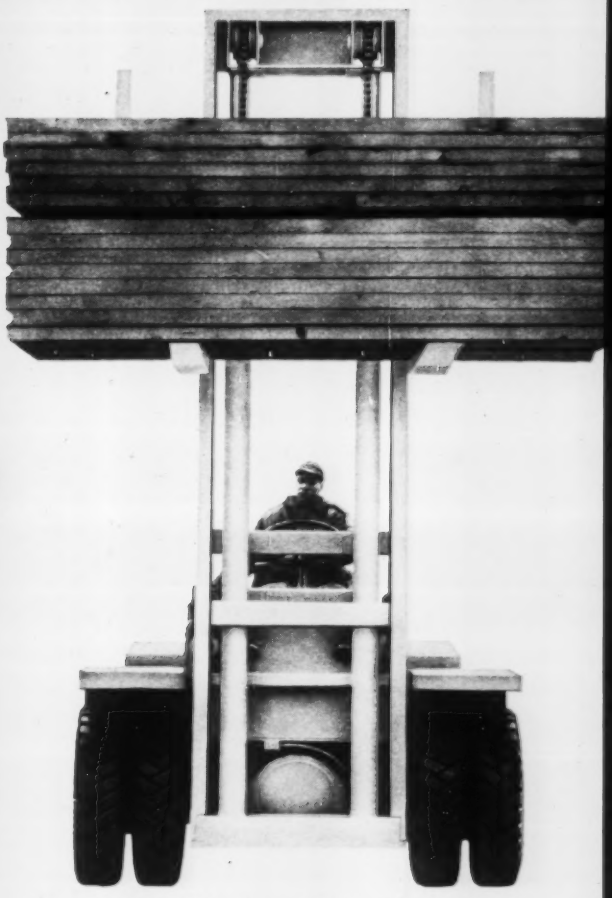
NEW YALE G-3



CAPACITIES: 15,000—20,000 LBS.

SERIES

the only high-capacity gas trucks with all three features you need for fast, safe handling of BIG LOADS



300% MORE VISIBILITY. "Wide-Angle Vision"—a Yale exclusive! Upright channels are wide-spaced and nested. Hoisting cylinders and lifting chains are right next to channels to reduce frontal obstruction. Fork carriage has only one top, one bottom bar for extra forward visibility at all levels of fork lift. Unique open front design plus high center position of driver provide a wide arc of vision—maximum visibility forward *and* to the rear for fast, safe handling of heavy loads.

GREATER STABILITY. You get maximum stability under capacity-load conditions—even over soft or bumpy terrain. Center of gravity is low. Underclearance is high. Large, high-flotation tires give plenty of traction. Articulated steering axle, rugged wide-spaced upright design, side-thrust rollers keep loads steady at all points of lift, minimize weaving.

EXTRA MANEUVERABILITY. Short overall length plus 75-degree steer-wheel angularity mean extra-tight turning radius —high maneuverability. Power steering helps driver to move in and out of tight areas fast. For fast cycle operations, these new Yale trucks feature lifting speeds up to 60 feet per minute... fast, controlled lowering...travel speeds up to 20 MPH.

New G-3 Series Gas Trucks Have Famous Yale Quality—Premium Engineering Features Included as Standard:

- **For extra strength:** All welded steel frame. H-beam members in frame. Rugged channel construction.
- **For driving comfort:** Hoist, tilt, attachment and gearshift controls are grouped for easy-reach, right-hand operation. Directional control on steering column.
- **For maximum safety:** Power brakes. Anti-cavitation valve in tilt cylinders prevents hydraulic voids, stabilizes channels.
- **For easy maintenance:** Hinged hood and removable covers give easy access to engine and all other operating units.
- **For smooth lifting action:** Channels and carriage are mounted on roller bearings with side-thrust rollers. Lifting cylinders are ball mounted.
- **Your choice of Fluid Coupling or standard transmission.** Gasoline or LP-Gas powered models. Wide range of attachments—all engineered for a minimum loss distance.

YALE*

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The Yale & Towne Mfg. Co., Yale Materials Handling Division
Manufacturing Plants in Philadelphia, Pa., and San Leandro, Calif.

Gasoline, Electric & LP-Gas Industrial Lift Trucks • Worksavers
Warehousers • Hand Trucks • Hand and Electric Hoists

The YALE & TOWNE Manufacturing Co.
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Please send me the new Yale High-Capacity Gas Truck brochure No. 5230A.

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Special fasteners to your requirements

Ferry Cap fills rush requests for custom-made threaded fasteners. That's been our business for 50 years.

To render even better service we will, if desired, "sit in" and help plan fasteners at the time products are designed.

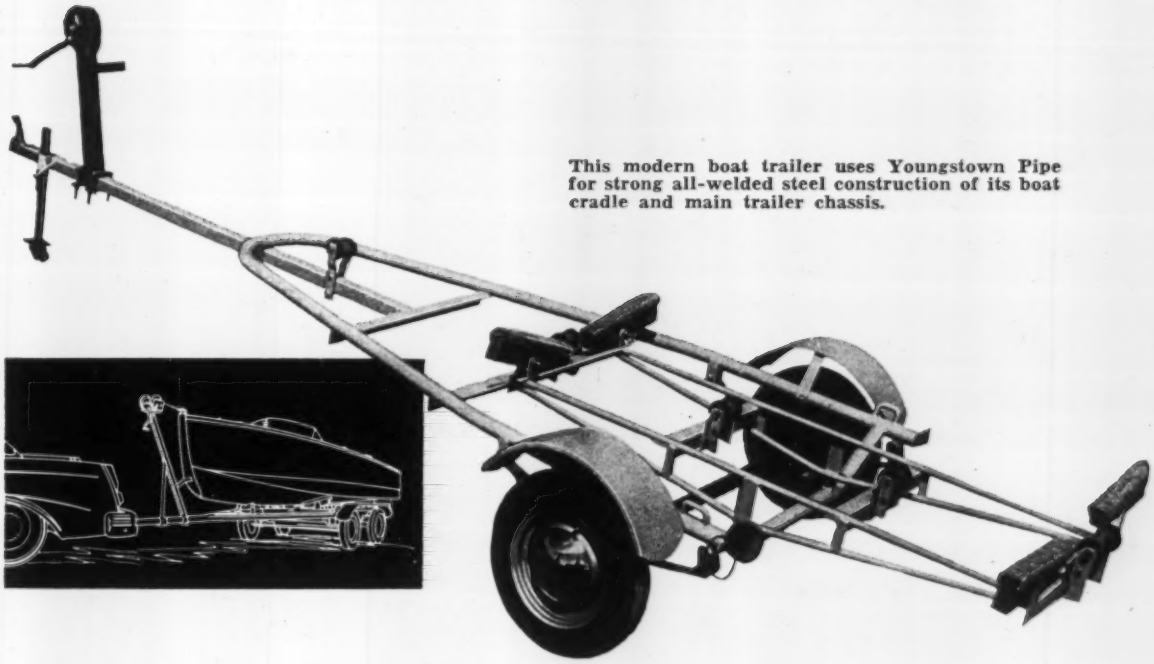
Even if you don't anticipate a fastener problem, we'll be happy to look over your preliminary drawings—frequently we can suggest fasteners that will cut costs and assembly time. You can count on Ferry Cap, so call on Ferry Cap *TODAY!*

THE FERRY CAP & SET SCREW COMPANY

Makers of the famous Countr-Bor® Screw for socket head applications.

2159 SCRANTON ROAD • CLEVELAND 13, OHIO

FERRY CAP *is geared to FASTER SERVICE*



This modern boat trailer uses Youngstown Pipe for strong all-welded steel construction of its boat cradle and main trailer chassis.

YOUNGSTOWN CONTINUOUS WELD PIPE

. . . provides extra-strength chassis for "Texan" boat trailers

Here's an unusual application for steel pipe. "Texan" Boat Trailers, produced by the Cunningham Trailer Works of Lubbock, Texas, are fabricated from Youngstown Pipe to provide users maximum cargo protection as well as greatest ease during loading, unloading and while making the haul.

In line with Cunningham's policy of using only the highest quality raw materials, they wisely specify Youngstown Continuous Weld Pipe for fabrication of both the boat cradle and main trailer chassis. This gives Texan boat trailers a sturdy welded steel construction able to withstand the most rugged use—on or off the highway. Why not use Youngstown Pipe structurally to build strength and quality into your products?

Your local Youngstown Distributor is the man to call when you want quality pipe—day or night. He has a complete stock and his on-the-spot fast delivery will help keep your operations humming along at top speed. Why not call him today?

Next time you need pipe—for any purpose—specify Youngstown and secure these 7 Points of uniform goodness

uniform ductility
uniform lengths
uniform threading
uniform weldability
uniform wall thickness and size
uniform strength and toughness
uniform roundness and straightness

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
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CLARK Type "CY" Starters, sizes 0 and 1, now have higher NEMA horsepower ratings

As shown in the table below, NEMA maximum horsepower ratings for size 0 and 1 AC magnetic across-the-line starters have been increased. Clark Type "CY" starters now available to meet these new standards will, in many cases, permit you to meet your requirements with smaller sizes. You can at once take advantage of the money and space savings made possible by this re-rating.

CHANGES IN NEMA STANDARDS FOR MAXIMUM HORSEPOWER RATINGS OF AC MAGNETIC STARTERS AND CONTACTORS

SIZE AND VOLTAGE RATINGS	MAXIMUM HP RATINGS	
THREE PHASE	OLD	NEW
Size 0 110V	1½	1½
Size 0 208/220V	2	**3**
Size 0 440/600V	3	**5**
Size 1 110V	3	3
Size 1 208/220V	5	**7½**
Size 1 440/600V	7½	**10**
SINGLE PHASE		
Size 0 110V	1	1
Size 0 208/220V	1½	**2**
Size 0 440/600V	2	**3**
Size 1 110V	1½	**2**
Size 1 208/220V	3	3
Size 1 440/600V	5	5

NOTE: HP ratings for plugging and jogging duty have not been revised.

IN ADDITION TO COST AND SPACE SAVING BENEFITS OF THE NEW NEMA RATINGS, CLARK Type "CY" STARTERS OFFER MANY OTHER ADVANTAGES:

Greater Dependability and longer life

- Heavy-duty mill-type construction.
- Large silver-to-silver twin-break contacts.
- Vertical lift, free-floating magnet uses no springs; pull characteristic assures positive contact closing and keeps magnet slam to a minimum.

Easier Maintenance

- Contacts and contact springs quickly and easily inspected—without tools.
- All parts readily accessible and replaceable from front without removal from panel or enclosure—screwdriver and wrench only tools needed.
- Magnet coils easily replaced.

Simplified Installation

- Generous wiring space.
- All terminals face the front.
- Pressure-type terminals line and load.

...and many others

These increased horsepower ratings for AC controls will be adopted for all forms of Clark across-the-line starting equipment.

Revised Clark Catalog sheets and price lists covering the new NEMA ratings are available on request.

The **CLARK CONTROLLER** *Company*

Everything Under Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

Spring steel within this range...

FOR THE MOST EXACTING NEEDS KNOWN TODAY!

• That this is the age of specialization is certainly true in the use of steels. And in this regard *Athenia Steel* customers benefit especially by two not-too-common factors. First, by extreme control of quality and uniformity, unsurpassed, seldom equalled *anywhere!* Secondly, by painstaking technical service to determine or develop precisely the right steel for any special need.

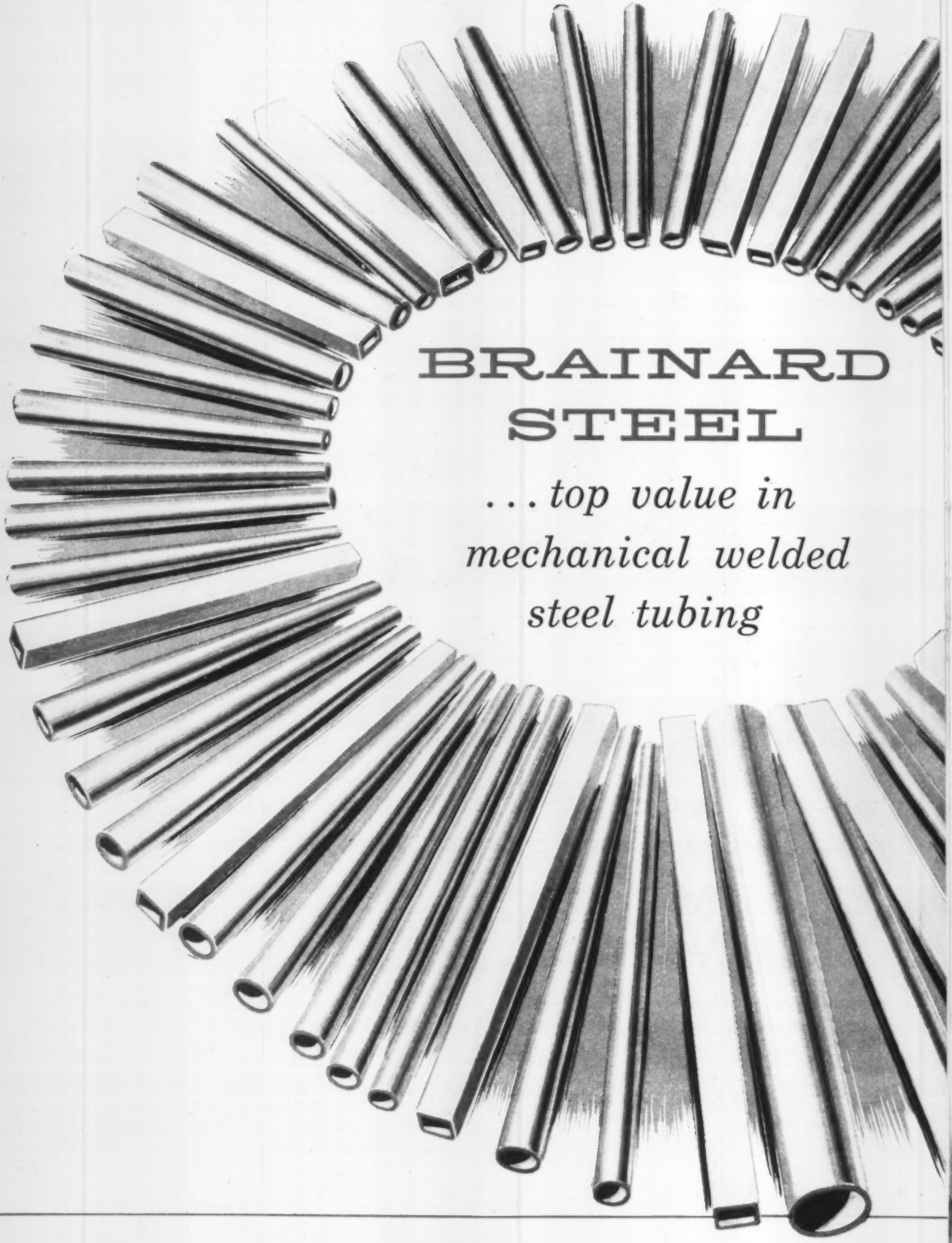
Here at Athenia we concentrate on cold rolled high carbon flat steels, custom made of .45 carbon and higher, in widths from .015″ to 16″ and thicknesses from .001″ to .065″. Full range of finishes and tempers. We also produce special narrow width stainless, and the new super-tough, corrosion resistant spring material, Nilcor*.

For a new and profitable experience in service and in steel controlled precisely to *your* needs... try us!

*Trade Mark National-Standard Company

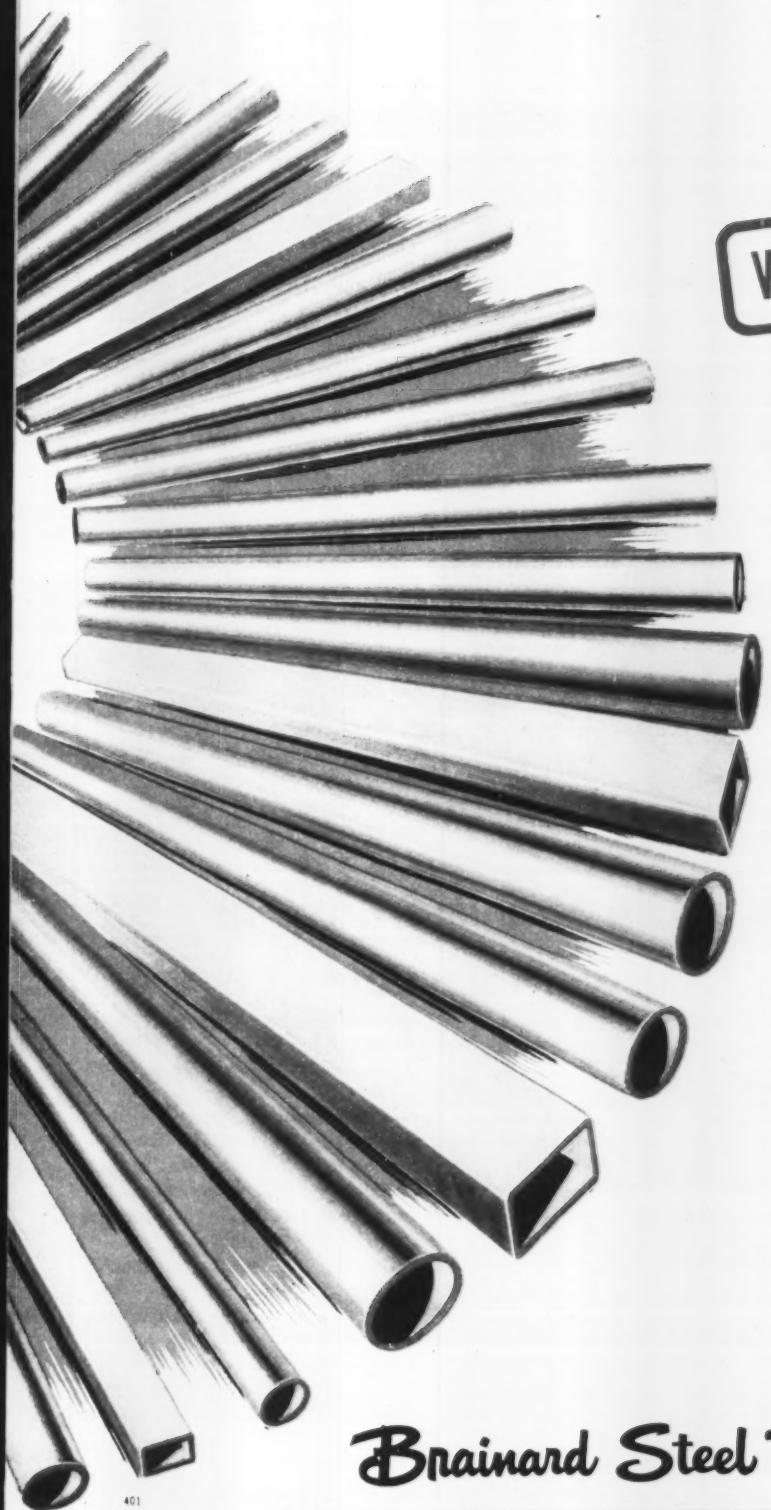
NATIONAL STANDARD

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; *tire wire, stainless, music spring and plated wires* • WORCESTER WIRE WORKS, Worcester, Mass.; *high and low carbon specialty wires*
WAGNER LITHO MACHINERY, Secaucus, N. J.; *metal decorating equipment* • ATHENIA STEEL, Clifton, N. J.; *flat, high carbon spring steels* • REYNOLDS WIRE, Dixon, Ill.; *industrial wire cloth*



BRAINARD STEEL

. . . top value in mechanical welded steel tubing



BRAINARD mechanical welded steel tubing is a top value buy because they give assured quality at competitive prices. Brainard Tubing, in sizes from ½" to 4" is also available in squares, rectangles, and special shapes.

VALUE = QUALITY / PRICE = BEST BUY!

Buying from Brainard has hidden values too!

DELIVERY! As a division of Sharon Steel, Brainard is assured of a constant supply of all grades of steel and can meet your delivery schedules.

VERSATILITY! Available in special shapes. Brainard Electric Welded Steel Tubing can also be swedged, pressure tested and delivered in many fabricated forms.

SERVICE! With a growing field organization, Brainard has representatives in all major cities and that's not all — Brainard will quote your requirements in short order.

so buy Brainard

SEND FOR THIS BOOKLET
For complete information on Brainard's Mechanical Welded Tubing.

BRAINARD STEEL TUBING
Griswold St., Warren, Ohio

Name _____

Address _____

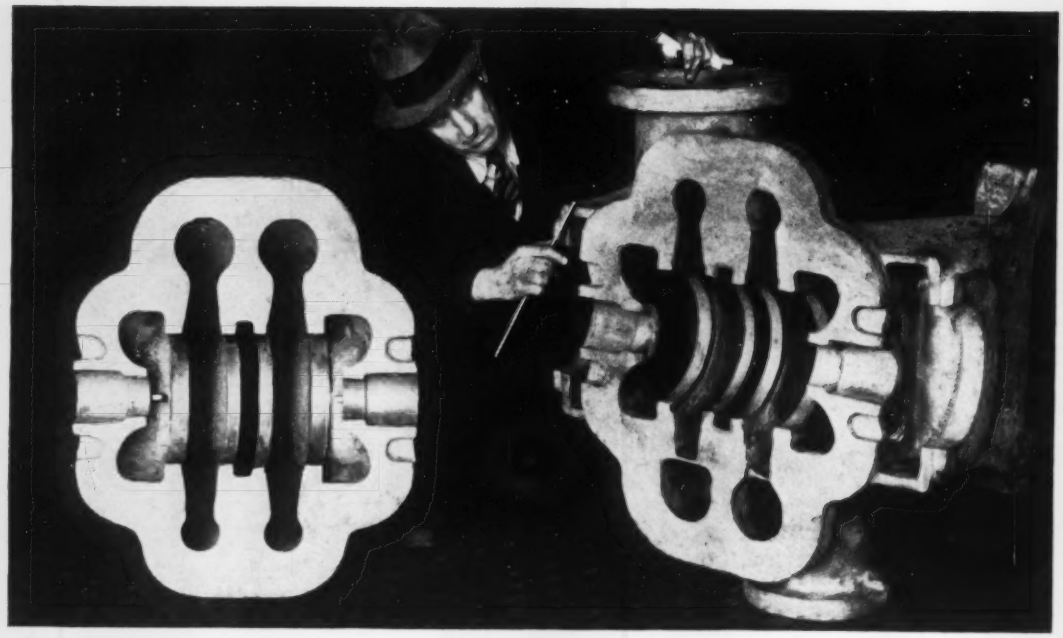
City _____ Zone ___ State ___

Brainard Steel Tubing

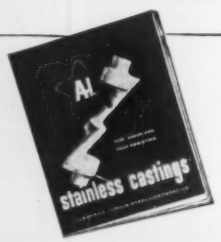
401

SHARONSTEEL

Brainard Steel Division, Sharon Steel Corporation
Griswold Street, Warren, Ohio



There's NO problem in Stainless Castings that we can't answer for you—



Write for this book on A-L STAINLESS STEEL CASTINGS

28 pages of valuable and complete data on stainless castings: analyses, properties, technical data on handling and heat treatment, typical applications, how to order, etc.

ADDRESS DEPT. S-931

Odd shapes or intricate sections are certainly no problem—look at some of our stainless steel casting products illustrated above. We could show you hundreds more. And size is no consideration, either—we're equipped to handle any stainless castings—from a few ounces to thousands of pounds.

The really important point for you to consider is not the matter of shape or size, but of *experience*. The A-L Buffalo Foundry is a group of specialists in high-alloy steel castings *exclusively* . . . pioneers in both the static and vertical-centrifugal methods of casting stainless steels.

For your assurance, there's a long record of years of successfully answering difficult service conditions with sound, clean-grained Allegheny stainless castings—free from defects, easy to machine and dependable in supply.

● Let us quote on *your* stainless casting requirements . . . any size, any shape. *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.*

WSW 6833

Make it BETTER—and LONGER LASTING—with

Allegheny Stainless

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Warehouse stocks carried by all Ryerson steel plants

Another score for you . . . and Cimcool

You'll score many an inside-the-plant home run . . . increasing production and lowering costs . . . when you let CIMCOOL° go to bat for you. CIMCOOL Concentrate is the largest selling chemical cutting fluid in the world. Here's how this radically new and different cutting fluid can win for your production team!

CIMCOOL LOWERS COSTS because it's longer lasting in machines. Thus, it reduces downtime and cuts costs for cleaning and changing.

CIMCOOL DOES A BETTER JOB because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.

CIMCOOL IS CLEAN, doesn't soil clothing or hands. It contains no skin irritants. It leaves no slippery film on shoes, floor, machine or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

Your CIMCOOL Distributor has valuable teamplay tips for you. He'll give you complete information on CIMCOOL Concentrate—and the entire family of CIMCOOL Cutting Fluids. Or contact us direct. We'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

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CIMCOOL **Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL **Tapping Compound**—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT **Concentrates** — For jobs requiring oil-base cutting fluids. Added to mineral oils, they give economical mixes for higher speeds and feeds.

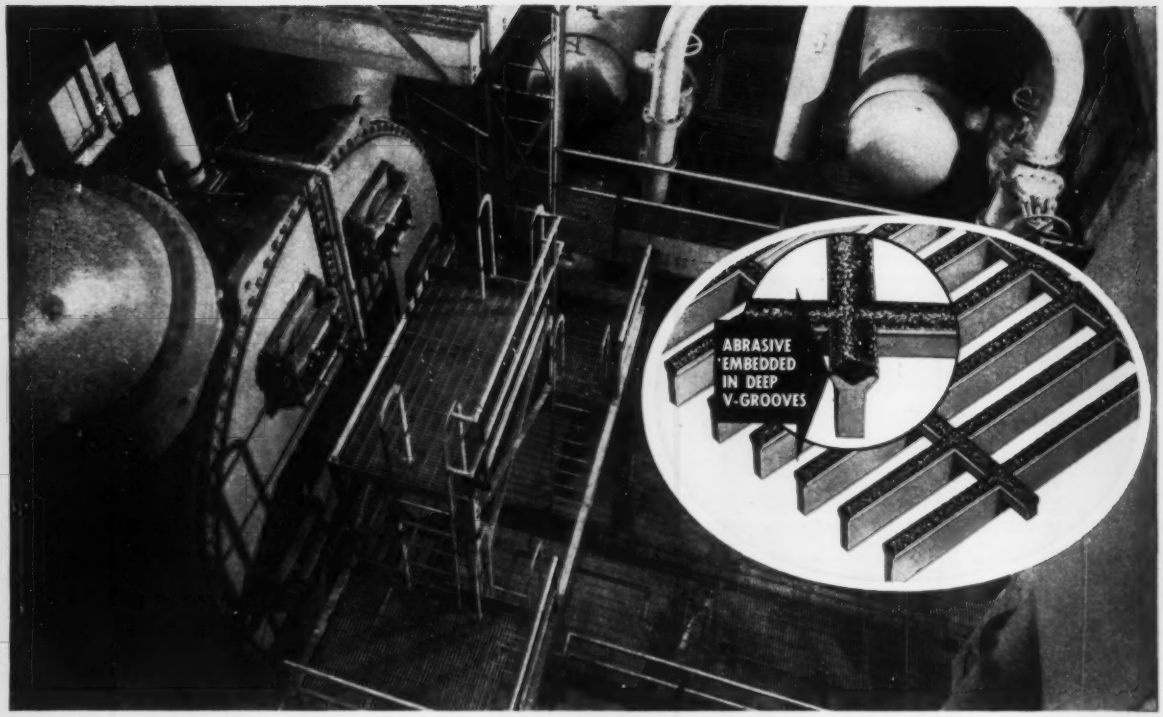
CIMCOOL **Bactericide** — The most effective agent yet developed to overcome rancidity and foul odors.

CIMCOOL **Machine Cleaner** — The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

CIMCOOL Cutting Fluids

for 100% of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.



Wears longer than steel . . . non-skid under oily conditions . . .

Reliance Relgrit®

abrasive embedded grating

Reliance Relgrit abrasive embedded grating and treads provide the only truly non-skid surface. Even when covered with oil, Relgrit has a coefficient of friction 30% greater than dry steel grating. Wear tests have shown that the abrasive surface will wear longer than steel, and retain its non-skid quality during its entire service life.

The top surfaces of the bearing and cross bars have 1/8" deep V-grooves in which is embedded abrasive aluminum oxide grains in a hard resin. The material is not affected by water, oil, gasoline, greases, or commonly used acids, alkalis and other chemicals. Together with its wear resistance, this gives Relgrit a long service life.

If you have floors or stairs which become oily, greasy, wet, or slick from any cause, Relgrit can provide safe footing at very low cost. Write on your letterhead for free sample and literature, or ask for our representative to call. It will pay you to investigate this remarkable new grating.

*you can't slip on Relgrit**

*Patent applied for

Please send Bulletin R655B describing Relgrit abrasive embedded grating and treads.

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RELIANCE
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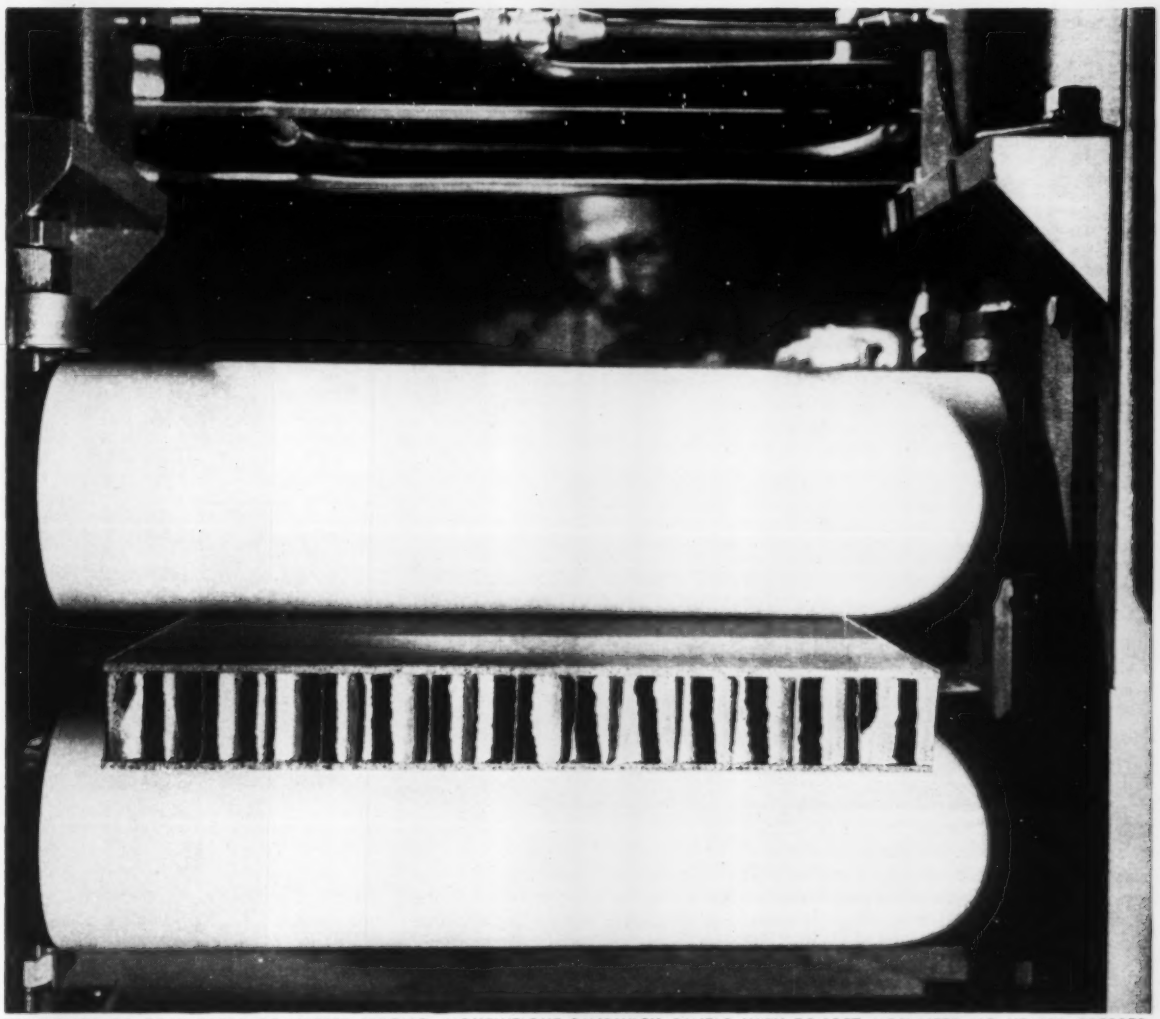
Relgrit Abrasive Gratings and Treads • Lightweight Bridge Flooring
Steel, Stainless and Aluminum Grating • Steel Mill Equipment

For fast, cold sandwich bonding ...3M Adhesive EC-1357



NIP ROLLER OR COLD PRESS COMPLETES STRONG, LIGHTWEIGHT SANDWICH PANELS WITH EC-1357. YOU NEED NO HEATED PRESSES.

Gain the speed and economy of cold bonding! Fabricate sandwich panels for non-load bearing uses with 3M Adhesive EC-1357.

This high-strength, flexible adhesive bonds sandwich panels without clamps or heated presses. You force-dry the solvent out of the adhesive before bonding. Cold press or nip roller finishes the job. You get maximum immediate strength. And EC-1357 builds up even more strength with age as it cures at room temperatures.

Because it is dark in color, EC-1357 absorbs drying heat fast. Thus it cuts production time, allows continuous movement from adhesive spraying to finished panel. EC-1357 resists moisture and normal temperatures, too. For load-bearing panels, investigate 3M Adhesive EC-1177.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU!

Consult 3M research. Contact your 3M Field Engineer. Or for information and free literature, write on your company letterhead to: 3M, Dept. 69, 417 Piquette Ave., Detroit 2, Mich.

PRODUCT OF 3M COMPANY RESEARCH

MINNESOTA MINING AND MANUFACTURING COMPANY · ADHESIVES AND COATINGS DIVISION

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Up to 40% higher tightening torques keep a

—and only the combination of an UNBRAKO screw

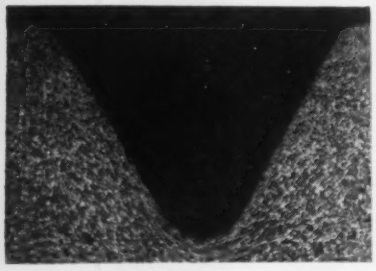
RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES (Inch-Pounds)

SCREW SIZE	UNBRAKO	SET SCREW B	SET SCREW C	MINIMUM DIFFERENTIAL %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

The High-Torque UNBRAKO socket set screw is made to withstand the highest tightening torques ever used to seat a set screw—up to 40% higher than an ordinary set screw. But to take full advantage of this UNBRAKO feature you must have a key that can apply the force required to seat it without damaging the screw or snapping the key. The High-Titan UNBRAKO hex key is designed specifically to set a High-Torque UNBRAKO so that you can be assured of full *high-torque* performance every time.

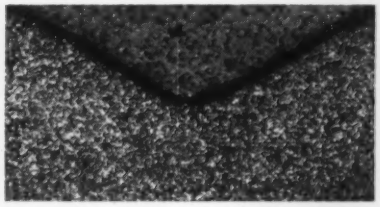
Here's why a High-Torque UNBRAKO can be seated tighter—and stay put

UNBRAKO SET SCREW



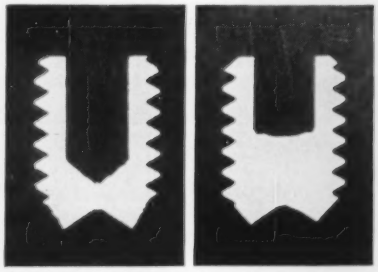
It has fully formed threads that make the whole screw stronger. The metal is compressed into the closely knit grain structure that you see in this illustration. The grain flow follows the contour of the threads. There are no straight lines along which shear can occur. The UNBRAKO retains its flow lines even when ground down to .010 in. below root diameter. Screws with cut or ground threads lose thread form at root diameter.

UNBRAKO SET SCREW



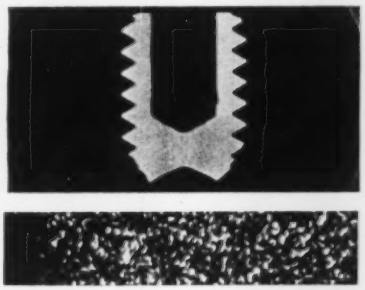
The High-Torque UNBRAKO has a radius in the socket corners. This eliminates the sharp corners where cracks start. It also distributes the stresses developed when tightening torques are applied. Ordinary socket screws have sharp corners which often crack when tightened even at lower torques than those recommended for UNBRAKO.

UNBRAKO SET SCREW **ORDINARY SET SCREW**



The High-Torque UNBRAKO has a deeper socket, which gives you more purchase with the wrench. Since more wrench can be put into the UNBRAKO socket, you can set the screw much tighter. And you won't ream the socket or round the corners of the wrench.

UNBRAKO SET SCREW

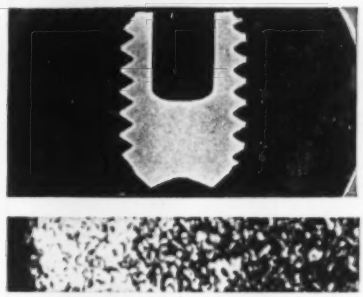


The High-Torque UNBRAKO is properly heat treated, kept clean. Its grain structure is uniform. It is free of decarburization. There's no danger of stripping the threads or shearing the point when tightening

High-Torque UNBRAKO socket set screw tight

and key assures full *high-torque* performance

ORDINARY SET SCREW



torques are applied. The ordinary screw is suffering from an overdose of decarburization; socket walls, threads and point are full of the telltale white spots that identify it.

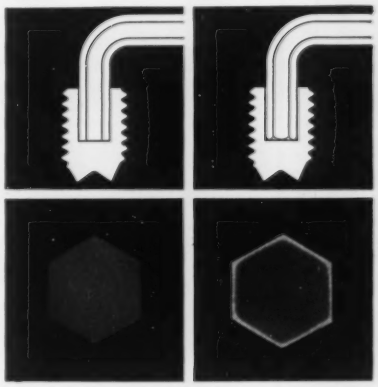
And here's why an UNBRAKO High-Titan hex key can be used to apply far more tightening torque to a High-Torque UNBRAKO socket set screw than is needed without damaging either the screw or the key.

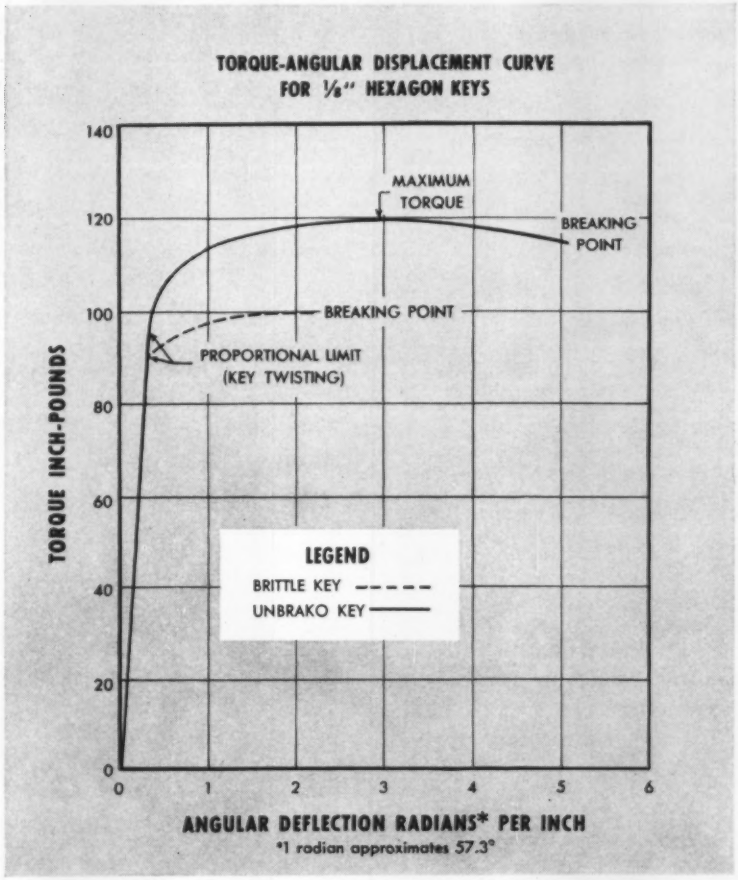
The High-Titan UNBRAKO is not an ordinary hex key. It is a precision internal wrenching tool with high ductility, specially designed to assure full high-torque performance. It is made of special alloy steel bar stock, inspected magnetically and chemically to make sure that the material is flawless and of the specified properties.

Its sides are flat and parallel. The corners, which exert torque on the inner walls of the socket, are sharp and tough. The bend is strong.

The High-Titan UNBRAKO is accurately sized across the flats and across the corners to insure snug fit and full wall contact. It won't ream or wear an UNBRAKO socket. The square cut end engages the full depth of the socket for greater tightening power. It gives you up to 25% more wrench engagement than a key with a chamfered end.

UNBRAKO KEY **CHAMFERED END KEY**





The High-Titan UNBRAKO hex key is heat treated in modern atmosphere-controlled furnaces. The surface is casehardened without decarburization. The extra hard surface gives the key longer life. And it retains its dimensional accuracy, is tougher and more ductile than ordinary keys. This torque-angular displacement curve for ⅛ in. hexagon keys distinguishes a High-Titan UNBRAKO from an ordinary key. The High-Titan UNBRAKO has a higher yield point and a higher breaking point—you can exert a much higher torque with it without snapping the key.

Be sure you get the full high-torque performance offered only by the combination of a High-Torque UNBRAKO socket set screw and a High-Titan UNBRAKO hex key. Both products are stocked by authorized industrial distributors. Ask the one nearest you for complete information. Or write STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

We also manufacture precision titanium fasteners. Write for free booklet.

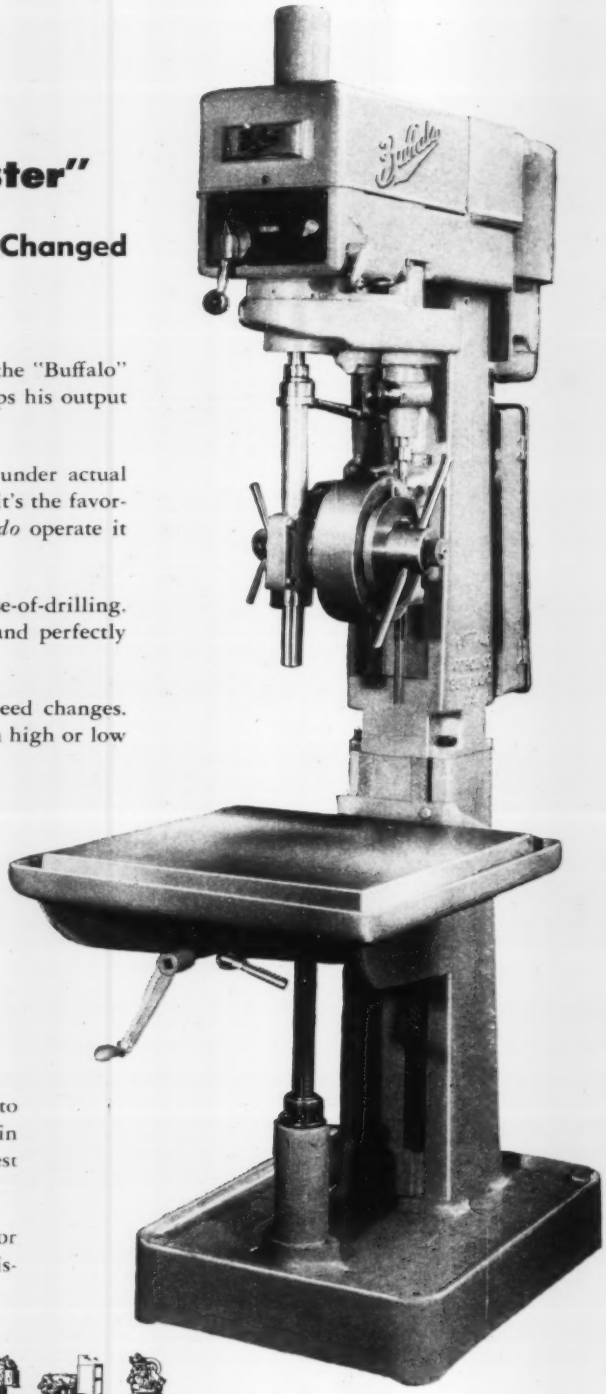
Unbrako Socket Screw Division **SPS** **Jenkintown, Pennsylvania**

Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Cooper Precision Products • Standco Canada, Ltd. • Unbrako Socket Screw Co., Ltd.

VERSATILITY UNLIMITED!

"BUFFALO" No. 1 "RPMster"

"1001" Speeds, Easily and Instantly Changed by Moving Just Two Controls!



Check with the man who uses one. He'll tell you why the "Buffalo" "RPMster" is the drill he *likes* to operate . . . how it ups his output . . . improves the quality of his work.

Because you have to operate this machine yourself — under actual shop conditions — before you'll really understand why it's the favorite of shopmen and supervisors alike. Only when you *do* operate it will you discover its many exclusive advantages.

One of these is extreme smoothness, quietness and ease-of-drilling. That's the result of the gearless variable speed drive and perfectly fitted spindle.

Another "RPMster" advantage is the instantaneous speed changes. The shift lever at the left of the head places the drive in high or low range. The dial at the right provides infinite speed variations in either range. These handy controls adjust precisely to speeds ranging from 100 to 3000 RPMs, for all your drilling, reaming and tapping operations.

Sturdily built for a long life of accurate, maintenance-free service, the "RPMster" is available in one- to six-spindle models. And, considering all the unique versatility it can add to your production and shop jobs, you'll find that it's mighty economical, too.

Try the "Buffalo" No. 1 "RPMster", and you'll want to put one or more of these outstanding drills to work in your plant. For a demonstration, contact your nearest "Buffalo" machine tool dealer — or write us today.

The "Buffalo" "RPMster" features the famous "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

BUFFALO FORGE COMPANY

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Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING

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You pay for mechanical and dimensional uniformity when you buy flat spring steel...you *get* it when you buy Roebling.

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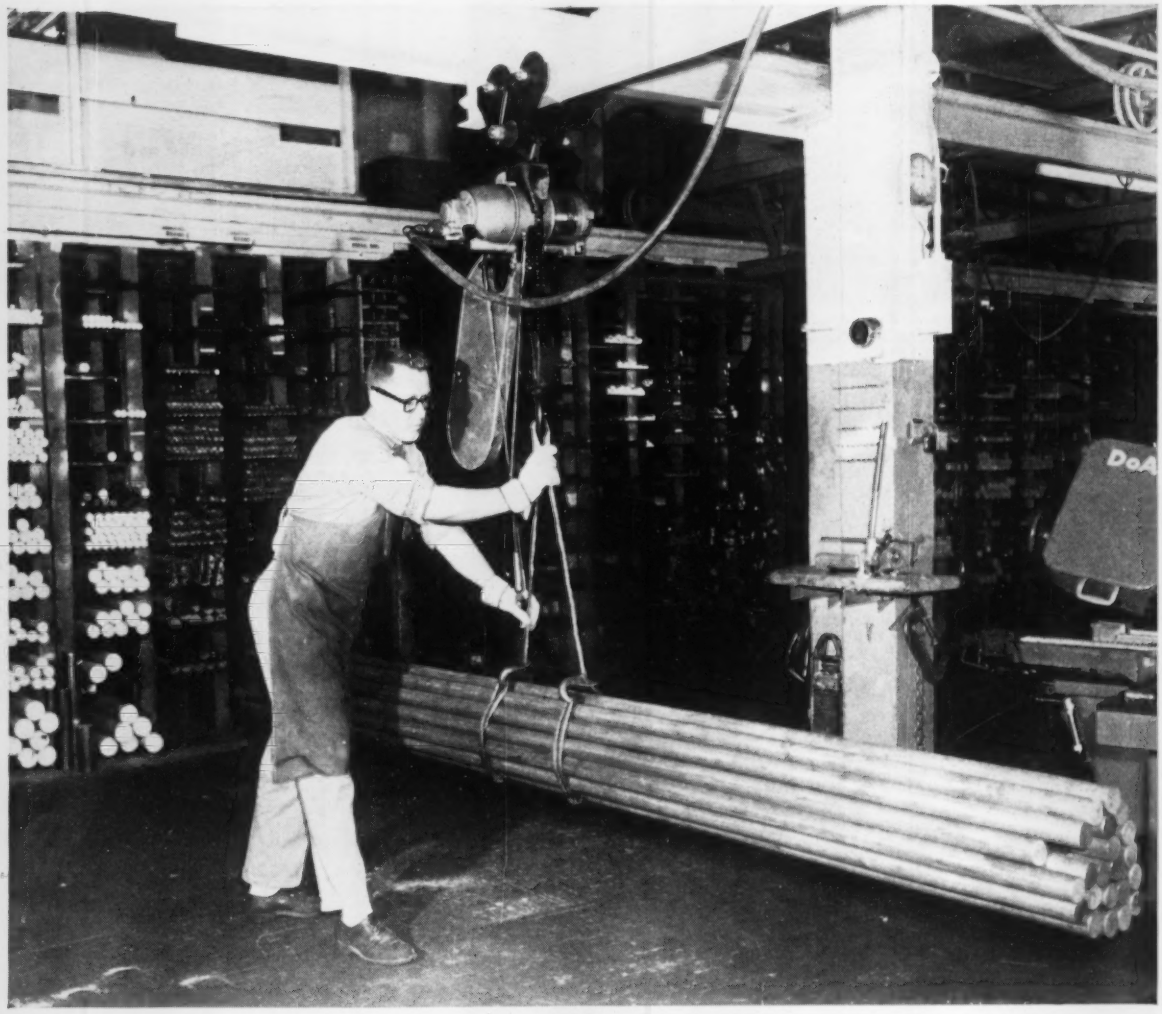
Roebling...Your Product is Better for it



4000 POUNDS OF POWER

in a 100-pound package

Raise 4000-pound loads at 10 feet per minute with this rugged Keller Tool air hoist. It weighs only 100 pounds, yet handles 2-ton loads with safety. Top and bottom swivel arrangement enables hauling as well as lifting.

Motor can't burn out. This hoist is powered by a Keller Tool axial piston air motor that can't burn out. Eliminates lost production.

Lightweight, relative to lifting capacity, this handy air hoist is easy to move and hang.

Economical. Air consumption is low. Unit requires little servicing or maintenance.

Easy, safe operation. Operator controls machine with one hand, guides load with the other. Powerful brake holds load regardless of air supply. Exclusive safety cable hole further protects operator and load.

Keller Tool air hoists are available in lifting capacities of 150, 300, 500, 1000, 2000 and 4000 pounds. Request Bulletin 86.

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN GENERAL INDUSTRY, CONSTRUCTION, PETROLEUM AND MINING

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

Something new...
made better
by aluminum

These 120-foot high-tension towers carry power across the 50 miles between Aluminium Limited's Kemano generating station and Kitimat smelter.

12-story aluminum towers carry world's largest high-tension cables

Across Canada's weather-wild Kildala Pass, aluminum is meeting a new challenge in structural design. These giant towers withstand tons of snow and wind pressure . . . support half-mile spans of ice-laden cable. Yet they were delivered by helicopter in prefabricated sections for quick assembly on the spot.

Aluminum a Natural

Aluminum was a natural for this job, since its properties match the specifications for strength, weatherproofness, light weight and easy assembly. Comparable steel towers would be 65% heavier and require 2⅓ times the man-hours to assemble.

Easily Fabricated

Created and engineered by Aluminium Limited, these towers also show how easily aluminum is fabricated. The tubular leg sections are formed in diameters to 38" by welding semicircular halves of rolled sheet. Crossarms are box girders up to 76 feet long, assembled with aluminum rivets.

New Fabricator Markets

With this knowledge and experience, independent U. S. fabricators can look for more business in heavy structural applications. To assure a dependable supply of primary metal for these future needs, Aluminium Limited is investing $3,000,000 a week in production facilities. Research, development and technical assistance programs are also expanding to further advance aluminum's position as the world's fastest growing metal.

Supplying U. S. industries with primary aluminum from Canada

Aluminium Limited *Sales, Inc.*

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Steel that goes into this bumper, being installed on one of America's fine cars, is ordered and tested to rigid specifications. The steel must be exceptionally clean, bright, flat, and with no surface defects. It must have close chemical analysis and internal quality so it will draw deeply without "orange peel." The company installing this bumper is so careful that in the last ½ million bumpers it has scrapped only ½ of 1% due to metal failure! Pittsburgh Steel's sheet constantly meets these exacting specifications.

Pittsburgh Steel's quality standards pay off as automakers in a highly competitive market demand...

Better Sheet Steel For Making Bumpers

Today, the makers of America's better cars are more than just critical when they specify steel for making bumpers. They realize that the broad and complex chromed areas front and back on their models must enhance the appearance of the cars if they expect to beat competition in today's tight market. They demand the best, and then test exhaustively against strict specifications to make sure they get it.

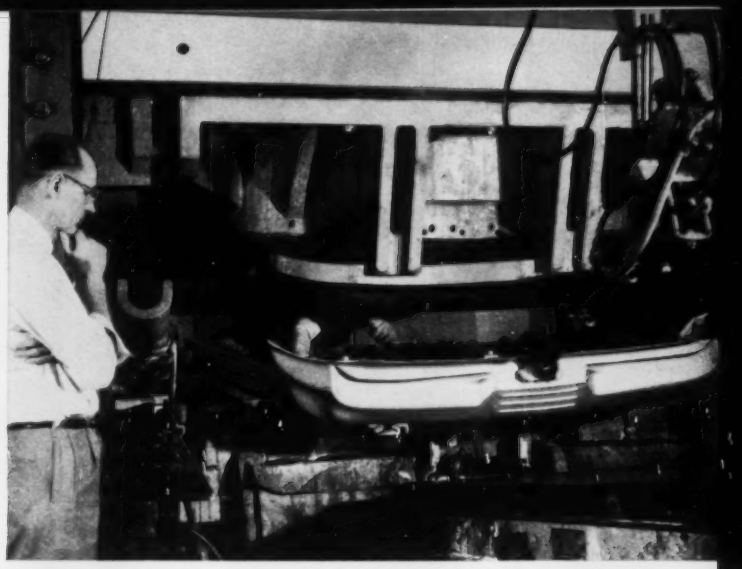
That's where Pittsburgh Steel Company shines. With its outstanding new cold rolling facilities backed up with the latest technology, it daily produces sheet for a variety of the toughest applications. When an automaker says of its bumper stock that yield must be held to 30-33,000 psi, and elongation must be 38% before failure—that's duck soup for Pittsburgh Steel. Orders like this come from one company that prides itself on less than one-half of one percent of scrap due to metal failure in the last half-million bumpers!

One bumper plant inspector put it this way: "We have to be especially careful to watch steel quality because, although the draw isn't unusually deep on wrap-around bumpers, it is very critical since it involves complex bends up to 120°. And even the tiniest stretcher-strain marks or other defects would show up like a sore thumb under the bright chrome finish."

If Pittsburgh Steel's sheets can meet standards as high as these, they can help you solve your forming problems, no matter how tough they may be. When you buy from Pittsburgh Steel you can always be sure you are getting sheet that has:

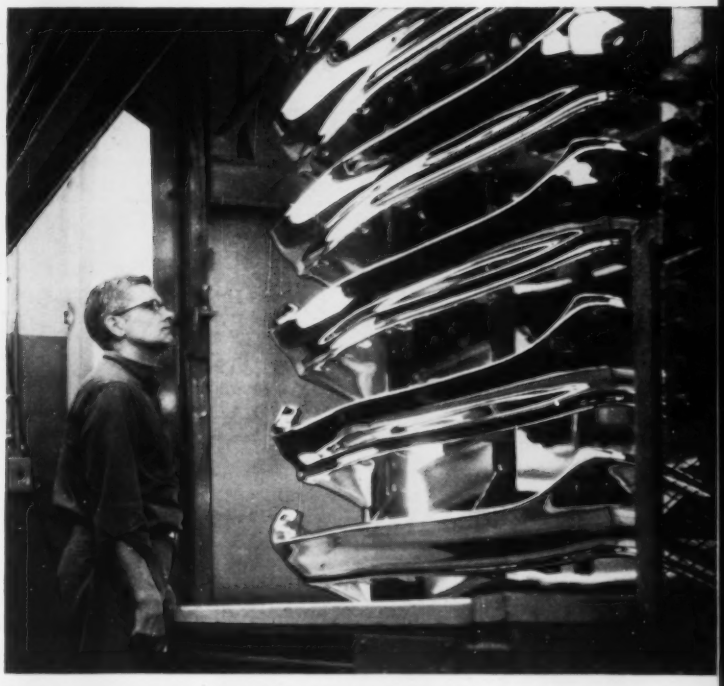
(Advertisement)

Grinding provides a surface finish which must not deviate more than 10 micro inches and since rarely more than 2% is taken off, the original sheet surface had to be excellent.



The draw of this massive press is critical since complex angles up to 120° must be achieved without steel failure. Sheet steel supplied by Pittsburgh Steel Company has excellent formability which stems from good internal quality.

After all drawing and stamping operations are complete, each bumper is carefully inspected before going to the plating line.



Each bumper gets a last close look after plating. The bright finish magnifies any defects so the surface must be perfect.

- **Superior Internal Quality**—proper uniform grain structure free from flaws and subsurface imperfections.
- **Good Surface**—clean, bright and smooth—free from scratches, pits and slivers.
- **Flat and Uniform**—consistent from sheet to sheet to save you scrap.
- **Formability**—excellent capacity to withstand deep drawing.

There is an experienced Pittsburgh Steel Company sales engineer as close to you as your telephone. He is at your service—eager to help you solve your toughest sheet problems.

Pittsburgh Steel Company

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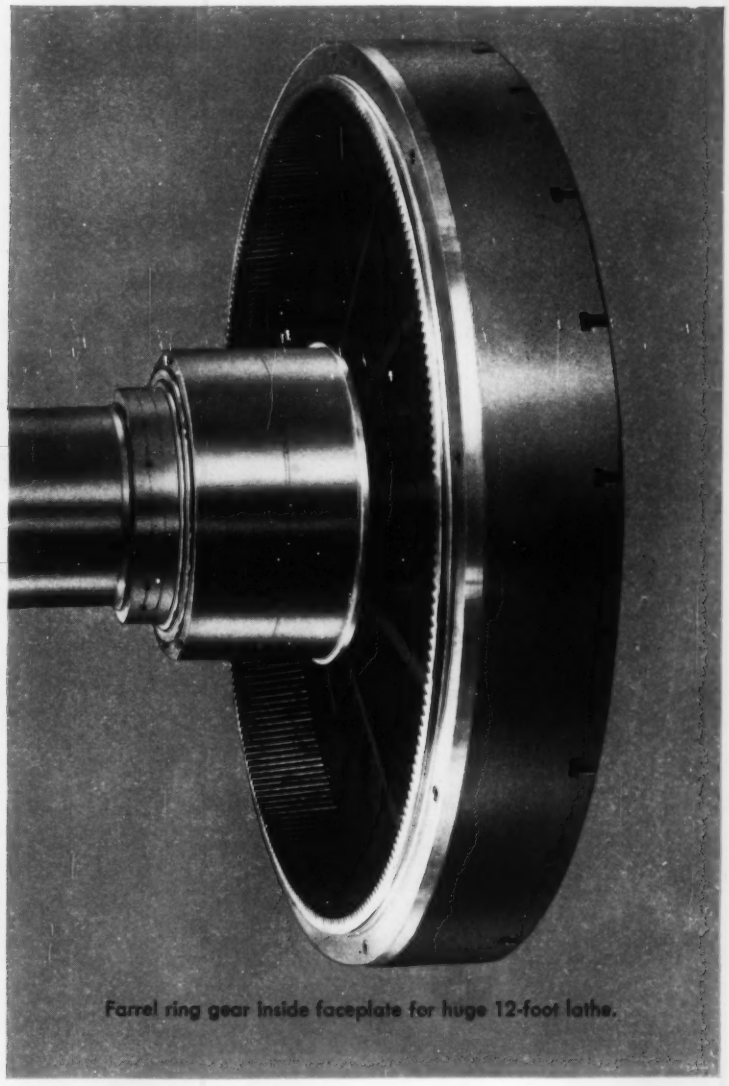
LARGE RING GEARS



Farrel ring gear inside faceplate for huge 12-foot lathe.

designed and built to your requirements

At Farrel, quality gears come in large packages. One example is the single-helical internal gear shown here in a 12-foot diameter, lathe faceplate. Designed to assure a smooth, vibration-free drive at relatively high speeds for the heavy work handled, the gear was precision-generated by the Farrel-Sykes method—a process that assures extreme accuracy of tooth spacing.

Farrel precision-generated internal gears are available with either single helical or spur teeth in sizes up to 23 feet blank diameter.

Farrel also makes external gears of the continuous-tooth herringbone, single-helical and spur types, in any size up to 23 feet diameter, for any power capacity or application.

Whatever your gear requirements may be, you can depend on Farrel's many years of gear engineering and manufacturing experience and complete production facilities.

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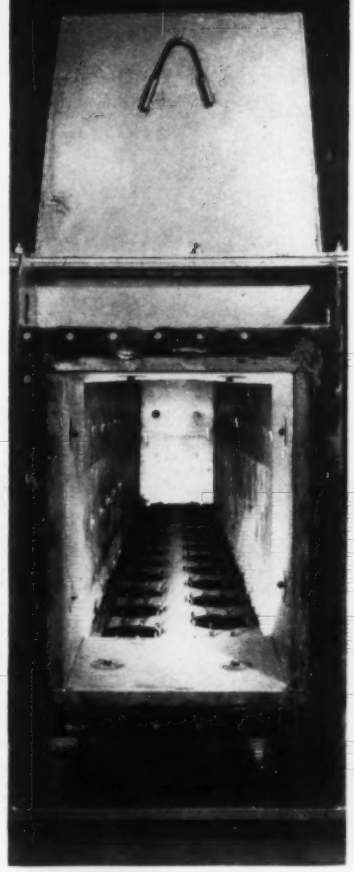
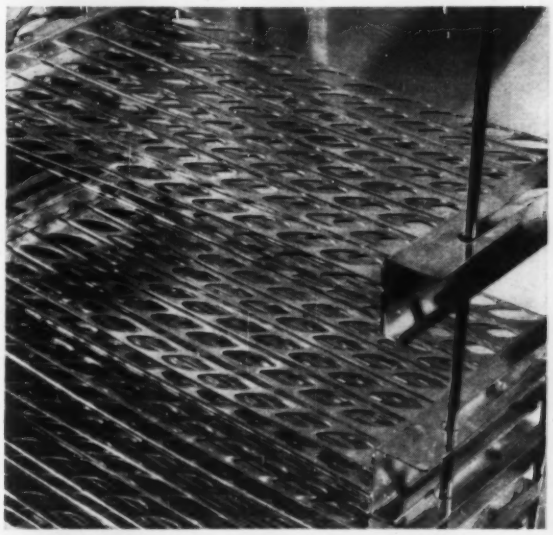
No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength, hardness, beauty, cleanability and easy fabrication. For a reliable source of supply, United States Steel offers you the widest range of types, finishes and sizes. **Just call your steel warehouse.**

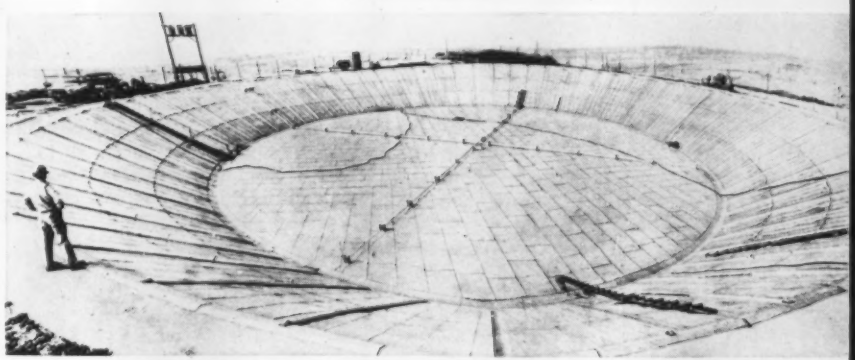


For High Temperatures. This recuperator is used on industrial furnaces. It uses waste flue gas to heat the incoming furnace air and thereby increase the efficiency of the furnace. Formerly, these recuperators were made with ceramic tubes, but heat transfer was low and leakage was high. The Hazen Engineering Company in Pittsburgh makes recuperators almost completely from Stainless Steel. Compared to ceramic designs, the Stainless design saves about 40% in fuel, increases furnace output about 10%-15%. The Stainless Steel performs well, even at this 1800-2300° F. temperature range.



For Cleanliness. When you work near nuclear radiation areas, you wear a small badge containing X-ray film that records how much radiation you have received. The film, "photo-dosimetric film," is developed in a Sensitometric Processing Unit made by Bar-Ray Products, Inc., in Brooklyn. The unit, including the trays shown here, is made completely from 18-gage Type 316 Stainless Steel because it resists corrosion, is easy to clean, has a hard, dense surface that doesn't harbor dirt.

For Corrosion Resistance. The Hercules Powder Company needed an ammonium nitrate storage tank for their plant near Richmond, California. They took an old, World War I concrete reservoir and lined it with Type 304 USS Stainless Steel. The 14-gage sheets are laced with 18,000 feet of vacuum-tested welds. Tank holds two **million** gallons of solution, and is 200 feet in diameter at the top. U. S. Steel's Consolidated Western Division handled the complete installation.



United States Steel Corporation, Pittsburgh - American Steel & Wire Division, Cleveland
Columbia-Geneva Steel Division, San Francisco - National Tube Division, Pittsburgh
Tennessee Coal & Iron Division, Fairfield, Ala.
United States Steel Supply Division, Warehouse Distributors
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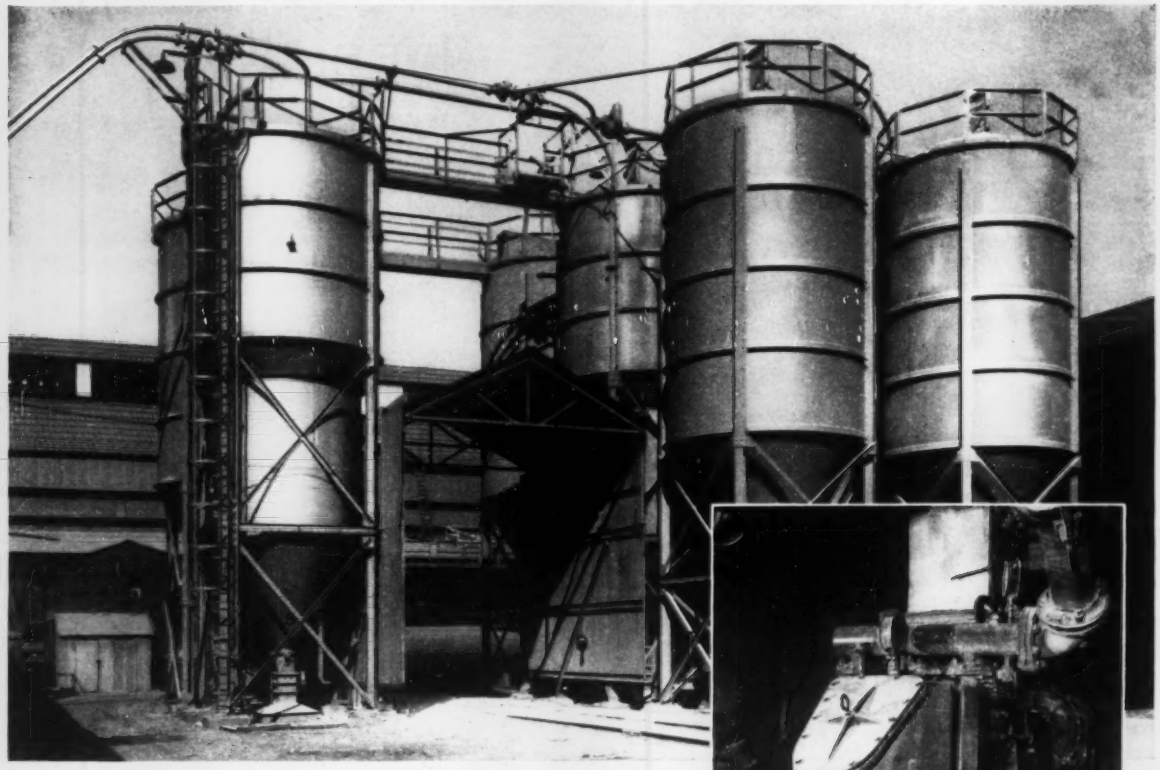
USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

UNITED STATES STEEL



Storage bins into which sand ingredients are conveyed by a Fuller-Kinyon Conveying System. Note the pipe-line system which permits ingredients to be conveyed into their respective bins.

One of two Fuller-Kinyon Pumps which convey sand ingredients to storage bins and from bins to mixers.

FULLER-KINYON CONVEYING SYSTEM HANDLES THREE DIFFERENT MATERIALS EFFICIENTLY, WITHOUT WASTE

To reduce costs and speed up handling of foundry sand ingredients with minimum waste, General Steel Castings Corporation, Granite City, Illinois, installed a Fuller-Kinyon Conveying System.

Here's what it does for them—

The system unloads corn flour, silica flour and bentonite from hopper bottom cars by means of Fuller-Kinyon Pumps which convey these materials through pipe lines to a number of storage bins. The flexibility of the system makes it possible to unload cars in a fraction of the time that would be required manually, *and*, waste due to spillage is eliminated. Two pumps used in the operation can be moved on narrow gage tracks for spotting under cars or bins. One pump is used mainly for unloading and delivery to storage—the other for delivery from storage to supply bins above the mixers. However, it is possible to unload cars and reclaim from storage simultaneously. Where bins are located so that they cannot discharge directly to a pump, an F-H Airslide® conveys from bins to the pump.

Prior to the Fuller installation, material was received in bags and manually unloaded, stored and transported to the mixers. It figures—*costs were much higher*. Now, waste has been eliminated! Another important feature—the company has realized extra savings by purchasing materials in bulk.

Fuller air-conveying systems are in operation in hundreds of plants throughout industry, cutting costs and increasing profits, day in and day out. The next time you have a materials-handling problem, why not get in touch with Fuller . . . chances are you will also profit.

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. . . . pioneers in harnessing AIR

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TENSION - TO KEEP YOUR BOLTED ASSEMBLIES TIGHTER LONGER

Wherever products are subject to movement, vibration, stresses and strains, more than tight fastenings are necessary to keep assemblies tight indefinitely. There must be constant tension in the assemblies and the one sure way to accomplish this is by the use of famous Reliance Spring Lock Washers. They not only retard "nut creep," but automatically compensate for bolt stretch, thread wear, expansion and contraction due to temperature changes.

Made of cold drawn spring steel in Reliance's own cold finished mill, the Spring Lock Washers are quality controlled throughout their manufacture and offer the reactive range and pressure necessary to keep bolted assemblies tighter longer. Reliance Spring Lock Washers have proved for fifty years an accepted standard in industry, and are produced in four standard series: light, medium, heavy and extra heavy for each screw and bolt size.

For more information please write for Engineering Bulletin W-50 or request a visit from one of our fastening engineers.

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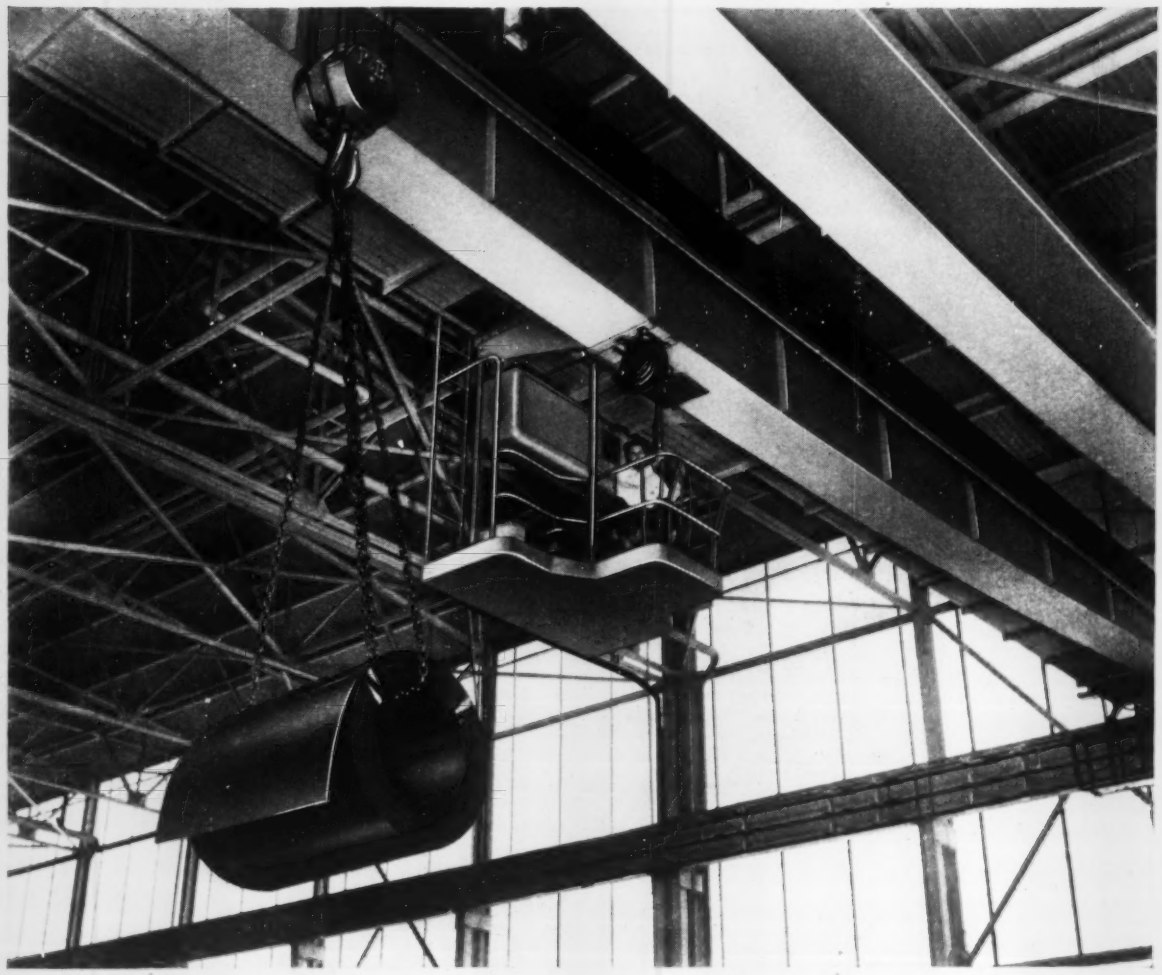

Here's why P&H Electronic Crane Control is your best crane investment!

1. P&H Electronic Crane Control furnishes "stepless" response that speeds production by giving smoother, faster, more positive load spotting. Loads weighing hundreds of tons can be positioned easily and precisely.

2. P&H Electronic Crane Control has a simple, efficient wiring circuit that eliminates 29 sets of contacts. As a result, this simple circuit cuts service time and cost . . . minimizes production downtime for repairs . . . eliminates costly crane maintenance. Over 400 installations prove its reliability.

3. *Exclusive* P&H Electronic Crane Control protects your crane against obsolescence. This revolutionary development is years ahead of the field, and P&H research works constantly to keep your crane modern as long as it is on your runway. You can install P&H Electronic Control on your present AC crane *of any make.*

For complete information, write for "Electronic Crane Control," Dept. 122E, Harnischfeger Corp., Milwaukee 46, Wisconsin.

HARNISCHFEGER

P&H ...quality and service for 73 years

Expanded metal can fit into your plans, too

Penmetal expanded metal used for delicate-fabrics compartment of clothes dryer. Strong, smooth open mesh allows warm air to circulate freely.

Penmetal expanded metal, introduced at the planning stage, can often mean the difference between failure and success of products like these. That's why so many top designers are taking advantage of its valuable properties—why you should, too!

Decorative . . . its clean, modern look puts sales appeal in your product. Functional . . . the diamond truss pattern adds strength; permits the free passage of sound, heat and air. Made of sheet steel, which is slit and stretched from one to ten times its original width, expanded metal is up to 80% lighter than solid sheet of the same dimensions. And, cost is moderate.

Penmetal expanded metal comes in carbon steel, aluminum, stainless steel, Monel, Inconel, etc. Large or small mesh. Light or heavy gauge.

Next time you're planning a new product, or boosting an old one, don't overlook expanded metal. It offers a world of possibilities for exciting design. Send for descriptive catalog 509-EM.

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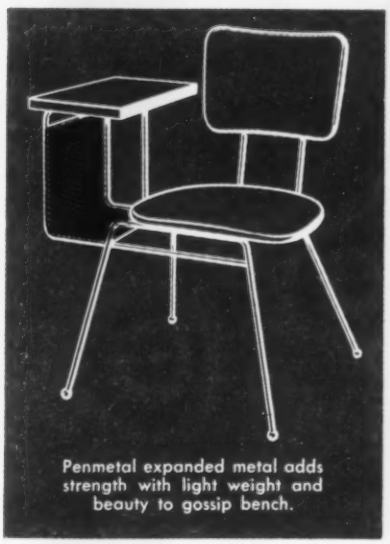
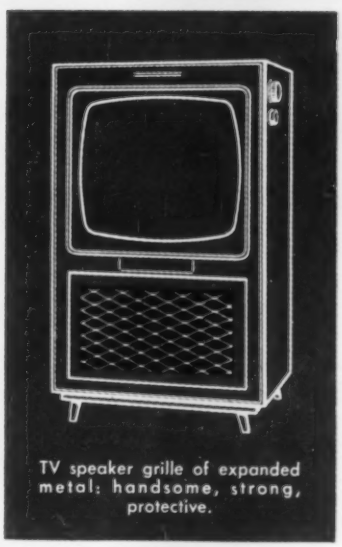
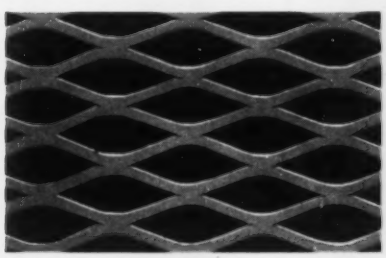


Penmetal expanded metal adds strength with light weight and beauty to gossip bench.



TV speaker grille of expanded metal: handsome, strong, protective.



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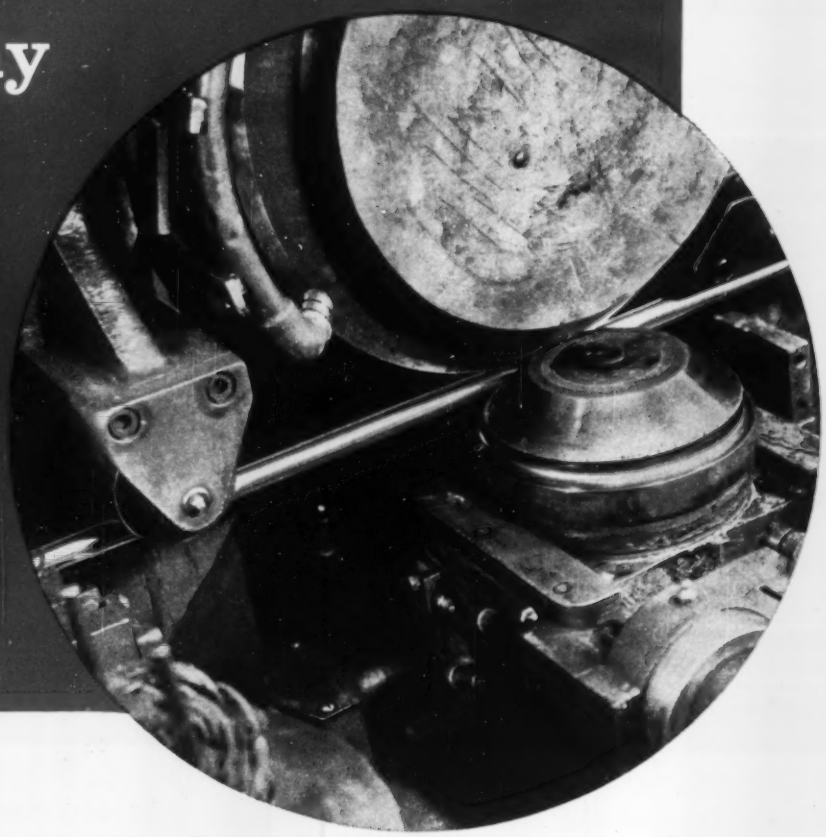
a name to remember

PM-151

Why BUNDY Tubing Company uses A.W. Cold Rolled Steel



When 95% of today's cars use Bundy Tubing in an average of twenty applications, you can bet that the tubing must be right . . . and that the requirements placed on steel quality are exacting.

Bundy requires sheet steel that will meet tough demands of precision forming . . . provide top end-product performance over long miles of road wear . . . yet hold tubing production costs in line with vigorous competition.

Alan Wood produces and delivers cold rolled sheet to Bundy . . . and all other customers . . . on an "individual" order basis. Alan Wood's own metallurgists investigate the uses of customers' end-products and fabricating methods —then control the production of steel for each customer through each step—from mine to mill.

As a result, customers have steel to exact specifications. Production down time is minimized and rejects due to sub-standard material are cut . . . all of which helps improve customers' profits!

If your product requires uniform, high-quality steel, investigate the advantages of Alan Wood services and integrated production. Write Marketing Div., Dept. CR-S70, today.

ALAN WOOD STEEL COMPANY

steelmasters for more than a century and a quarter • CONSHOHOCKEN, PA.

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia New York • Los Angeles • Atlanta • Boston • Buffalo • Cincinnati Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul San Francisco • Seattle

Montreal and Toronto, Canada—A. C. Leslie & Co., Limited

IRON PRODUCTS
"Swede" *pig iron*

STEEL PRODUCTS
Plates (sheared)
A.W. Dynalloy (high strength steel)
Hot rolled sheets
Hot rolled strip
Cold rolled sheets
Cold rolled strip

ROLLED STEEL FLOOR PLATE
A.W. ALGRIP *abrasive*
A.W. SUPER-DIAMOND *pattern*

COAL CHEMICALS

A.W. CUT NAILS
Standard & Hardened

MINE PRODUCTS
Iron ore concentrates
Iron powder
Crushed stone
Sand

COKE
Foundry, industrial & metallurgical

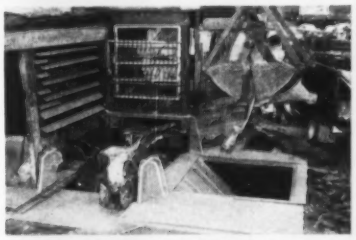
PENCO METAL PRODUCTS DIVISION
Steel cabinets, lockers & shelving

Loef Co. "From-Scale-to-Bale" Efficiency features 7-hour, 95,000 lb. production of Dempster-Balester!

1. Load of scrap is weighed-in . . .

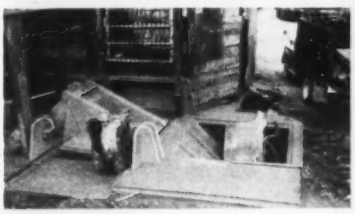
2. . . . by Mr. R. L. Blumberg.

3. Crane takes scrap from truck . . .



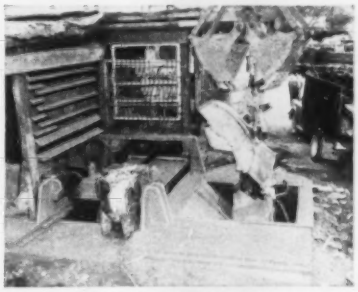
4. . . . to Dempster-Balester's Skip Pan.

5. Auxiliary-Compression Door CRUSHES . . .



6. . . . preceding charge into charging box.

7. Charging Box Door closes; scrap is baled.



8. Then bale is ejected—a 1-2-3 operation. 1. Skip Pan LOADS Charging Box. 2. Auxiliary-Compression Door CRUSHES scrap metal deep into box. Charging Box Door closes and charge is baled while Skip Pan is re-loaded. 3. Then, bale is EJECTED and Skip Pan dumps another load into charging box — a fast, continuous and efficient baling cycle that permits you to produce compact, high density bales, one-after-another!

Note how Dempster-Balester operator moves Skip-Pan Loader up to dump next charge into box and simultaneously moves Auxiliary-Compression Door down to CRUSH the scrap when it is dumped into box.

Note above that with usually one stroke the scrap is CRUSHED into charging box, ready for baling.

Business men in Athens, Ga., call The Loef Company's scrap metal collection operation a "from-scale-to-bale" production plant. It's a tribute to the efficient operation at The Loef Co., headed by Harry Loef.

Turning salvable scrap metal into segregated re-usable products calls for engineering. And hundreds of scrap metal engineers like Harry Loef and son-in-law R. L. Blumberg weigh-in scrap secured by regular collectors . . . then, minutes later, compress the loads into compact bales by efficient, fast Dempster - Balester presses!

MR. HARRY LOEF

For eight years The Loef Co. used a Dempster - Balester Model "275". This, their first press, produced on the average of 90,000 lbs. of baled scrap in 14 hours. When the operation expanded and a faster press was required, the "like new and still efficient" Model "275" was sold and Mr. Loef purchased the faster Dempster-Balester Model "700". The "700" increased production to an average of 95,000 lbs. of baled scrap in 7 hours! However, although not in an industrial area, a 109,000 lb. carload of lamination was recently purchased for a test-run through the press. The Dempster-Balester accomplished the task in 1 hour and 33 minutes. "That just gives you an idea what this Dempster-Balester can do," reported Foreman J. J. Escoe, who added: "Too, of course, much of the credit belongs to Henry Knight, our crane operator, and Mark Garing, press operator. They're good!"

Big advantages of the Dempster-Balesters, according to Mr. Loef, are minimum investment, minimum installation expense and high operating efficiency. "We just don't have any maintenance to speak of," added Mr. Escoe. "But, we clean and grease our Dempster-Balester regularly. Might add that a man couldn't ask for any better parts service. Dempster Brothers sure take care of their presses."

High tribute to us. We appreciate it. We are proud of the accomplishments of our Dempster-Balesters, and of our service staff. We believe you, too, will find your wisest and most profitable press investment will be in a Dempster-Balester! Write us today for complete information. *Manufactured by Dempster Brothers, Inc.*

DEMPSTER BALESTER®

DEMPSTER BROTHERS, 697 DEMPSTER BLDG., Knoxville 17, Tenn.

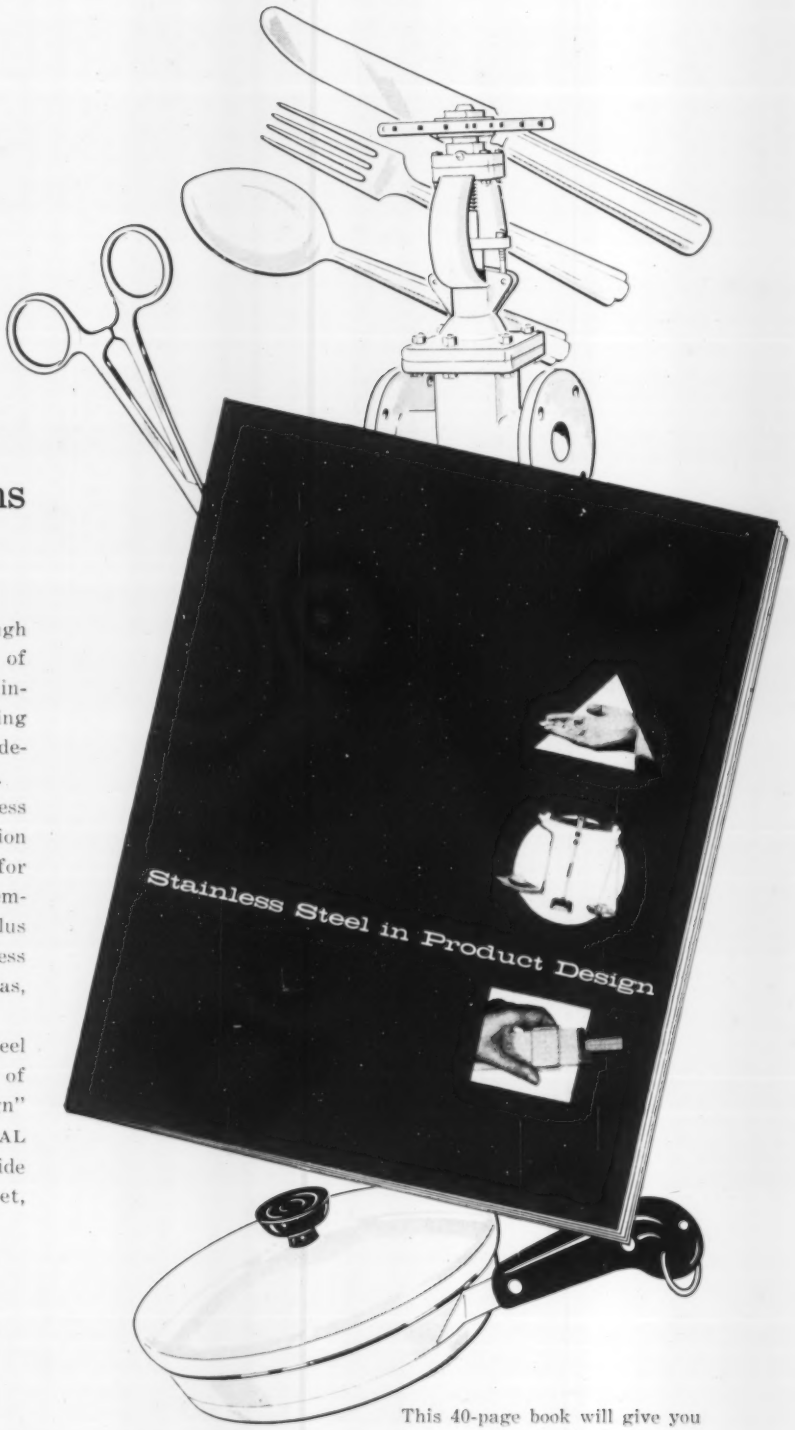
STAINLESS STEEL MAKES THE DIFFERENCE

...its effect on the sale of new designs

Designers gain prominence through the effectiveness and saleability of their work. The sales appeal of stainless steel is a powerful tool for selling new designs. It has turned many design ideas into profitable products.

The recognized merits of stainless steel, such as strength and corrosion resistance, make it equally "right" for housewares, jet engine parts, or chemical equipment. These qualities plus a variety of finishes have put stainless into planes, trains, cars, cafeterias, and scores of other places.

For more facts about stainless steel see your supplier. For a free copy of "Stainless Steel in Product Design" write: ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.



This 40-page book will give you important facts about selecting and applying stainless steel. Write for it today.

METALS DO MORE ALL THE TIME
...THANKS TO ALLOYS

Electromet
FERRO-ALLOYS AND METALS

UNION CARBIDE

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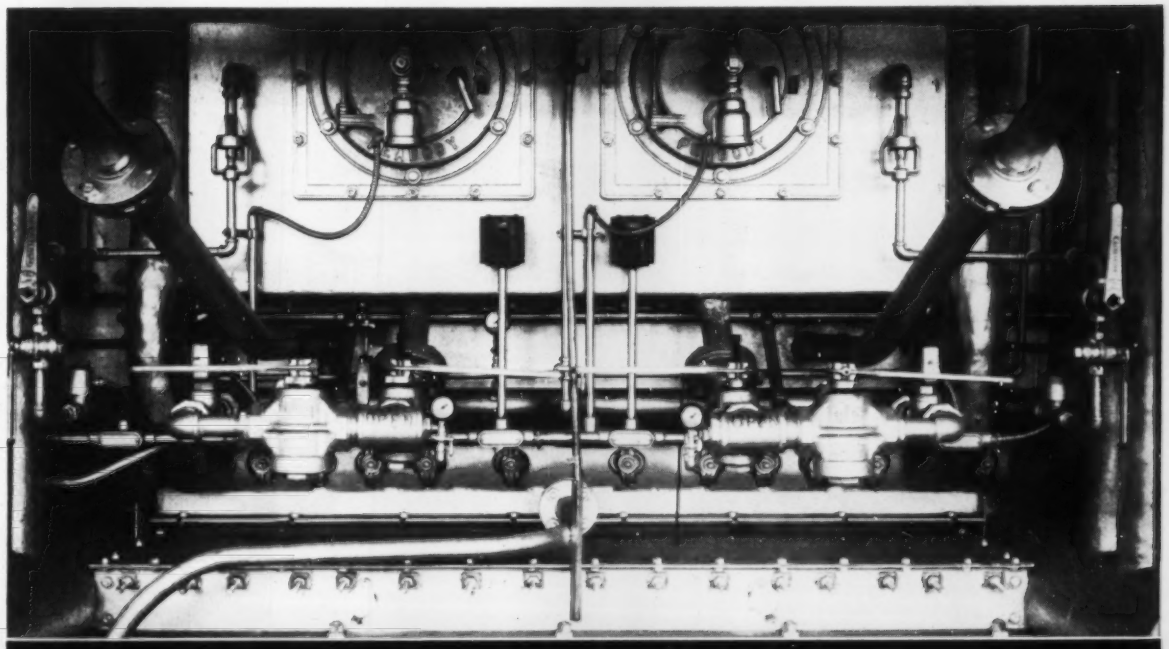


controlling gas to furnaces and boilers...

AN IMPORTANT JOB DONE BY

HOMESTEAD *lubricated* PLUG VALVES

AT A. B. DICK COMPANY, CHICAGO

An analysis of numerous types of valves convinced the A. B. Dick Company that HOMESTEAD Lubricated PLUG VALVES were well suited for use on gas lines to furnaces and boilers in their Chicago, Illinois plant. In fact, there are more than 5,000 Homestead Valves of various types in this plant. Satisfactory performance from the valves they have chosen is guaranteed by built-in features such as:

1. 100% Pipe Area—streamlined ports—minimum resistance to flow —minimum pressure drop.
2. Controlled Pressurized Lubricant System prevents sticking, by instant piston-like movement of plug at start of lubrication.
3. Extruded lubricant around stem indicates system is full; serves as stop signal to prevent overlubrication. No clogging of low pressure lines with lubricant, fouling of meters, orifices, etc.
4. Triple Head Seal—two rings of lubricant and reinforced Teflon stem seal. Stem seal holds pressure even without lubrication.

. . . plus many others. To know the meaning of real valve economy and service, install a few of these valves under your own service conditions. You'll be glad you did.

Your copy of Valve Reference Book No. 39-5 showing Homestead Lubricated Plug Valves will be sent on request.

Please mail, without obligation,
Valve Reference Book
No. 39—Section 5.

Name _____ Title _____

Company _____

Address _____

City _____ State _____

HOMESTEAD VALVE MANUFACTURING COMPANY

P. O. BOX 22 *"Serving Since 1892"* CORAOPOLIS, PA.

UNITED STATES STEEL CORPORATION—with a successful six-year experience using Permanente 165—adds another Permanente 165 bottom at #5 Open Hearth Shop, Homestead Works.

EACH BATCH of Permanente 165 Ramming Mix is checked for correct moisture content by a Kaiser Chemicals' Technician.

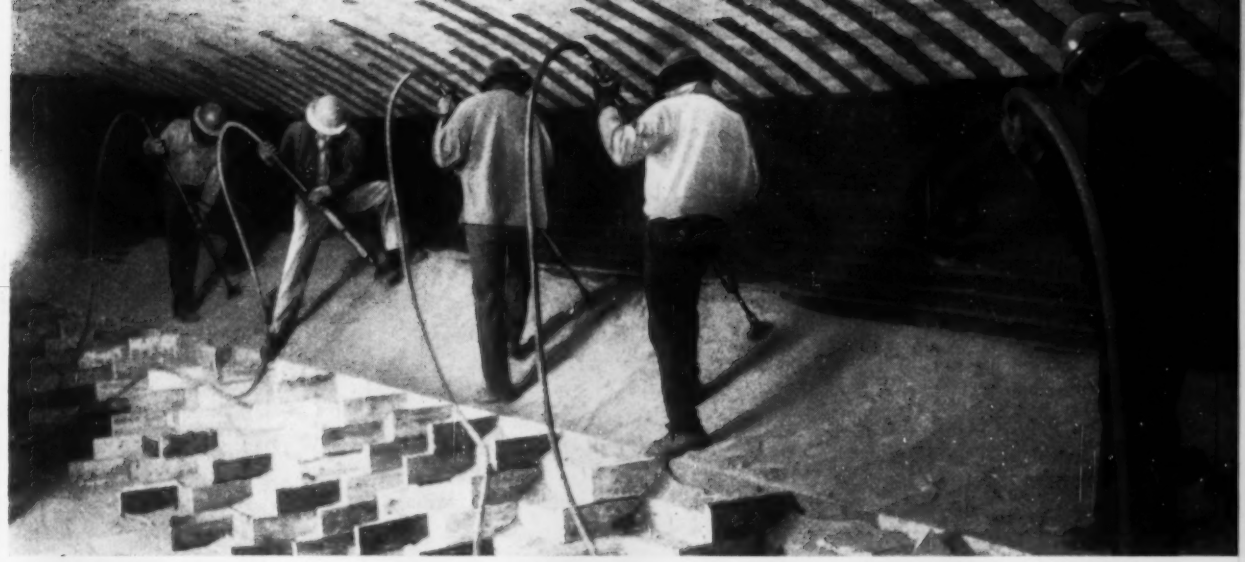
U. S. STEEL INSTALLS

This Permanente 165 bottom is the 91st for United States Steel Corporation . . . and at #5 Open Hearth Shop, Homestead Works, it becomes the *tenth* furnace with a 165 bottom out of eleven furnaces on the line.

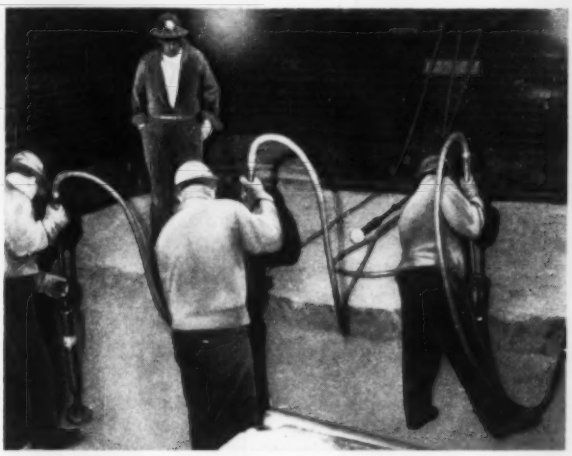
There is a good reason why U. S. Steel is using more and more 165 for furnace bottoms.

Experience has *proved* that it lasts significantly longer than other materials . . . that it requires fewer repairs and less down time . . . that it helps produce greater tonnage at lower bottom cost!

One of the reasons for this performance is Permanente 165's complete resistance to hydration under the most severe conditions. Another is its remarkable resistance to attack by iron oxide and slag. And still another is its installed high density—averages 175 lbs. per cubic foot *in the bottom where density means longer life.* Permanente



RAMMERS COMPACT 165 against back wall as furnace bottom nears completion. When on line again, furnace will produce 300 tons of steel per heat.



CAREFUL RAMMING assures dense monolithic bottom after burn-in with more pounds of MgO per cubic foot (165 lbs.) than any other ramming mix.

IN PRODUCTION this new tap hole lasted 108 heats before repiping. Sub hearth shown here plus other portions of furnace were built of Kaiser Periclase Brick.

ITS 91st PERMANENTE 165 BOTTOM

165 is made from high purity Kaiser Periclase refractory grains, 94-96% MgO. And because it ceramically bonds itself into a crystalline mass at relatively low temperatures, you get a tough, dense homogeneous bottom fast.

A new, completely revised 28-page manual, "Suggested Methods of Installing Permanente 165 and 84 Ramming Mixes," gives complete details. Send for your free copy.

Call or write Kaiser Chemicals Division, Dept. R7451, KAISER ALUMINUM & CHEMICAL SALES, INC., at any of the addresses listed below.

PITTSBURGH 22, PA. . . . . 3 Gateway Center
HAMMOND, IND. . . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . . 1924 Broadway

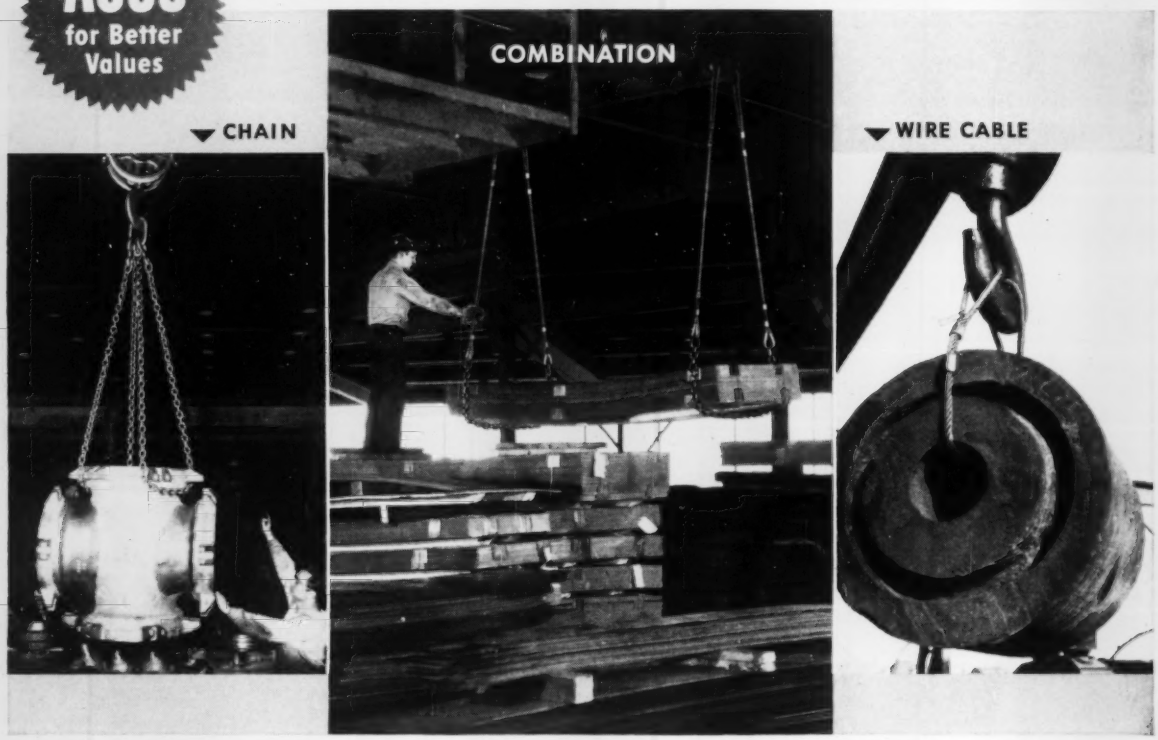
Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK & RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

ACCO for Better Values

Acco Registered® Slings—Chain and Cable



ACCO—your first source for any sling for any job

Whatever your sling requirements, there's an ACCO *Registered* Sling to do your particular lifting job in the safest, most economical way possible. Your rigger knows why certain slings should be used to lift certain types of loads, depending on varying factors of shape, weight, material and finish. Sometimes chain slings are necessary; other times cable; and on certain lifts a combination of chain and cable slings are best.

Because sling work requirements do vary from job to job, make certain that all your slings are precision-made under uniform conditions of quality control and pre-tested before they leave the factory. Only ACCO *Registered* Slings can give you this assurance...in the widest range of sizes and styles from any single source.

In addition, you get the latest technical improvements in ACCO *Registered* Slings. For example, there's the new shaped Master Link now available without extra charge on all ACCO *Registered* Slings. This new link, an exclusive development of ACCO engineers, gives 18% greater resistance to distortion with no increase in weight. Just one more quality bonus you get from ACCO *Registered* Slings.

Each of these slings is factory proof-tested at a load of no less than twice its rated capacity. Only after a sling has passed this rigorous test is it given the ACCO tag and certificate of registration.

Tell your distributor you prefer ACCO *Registered* Slings.

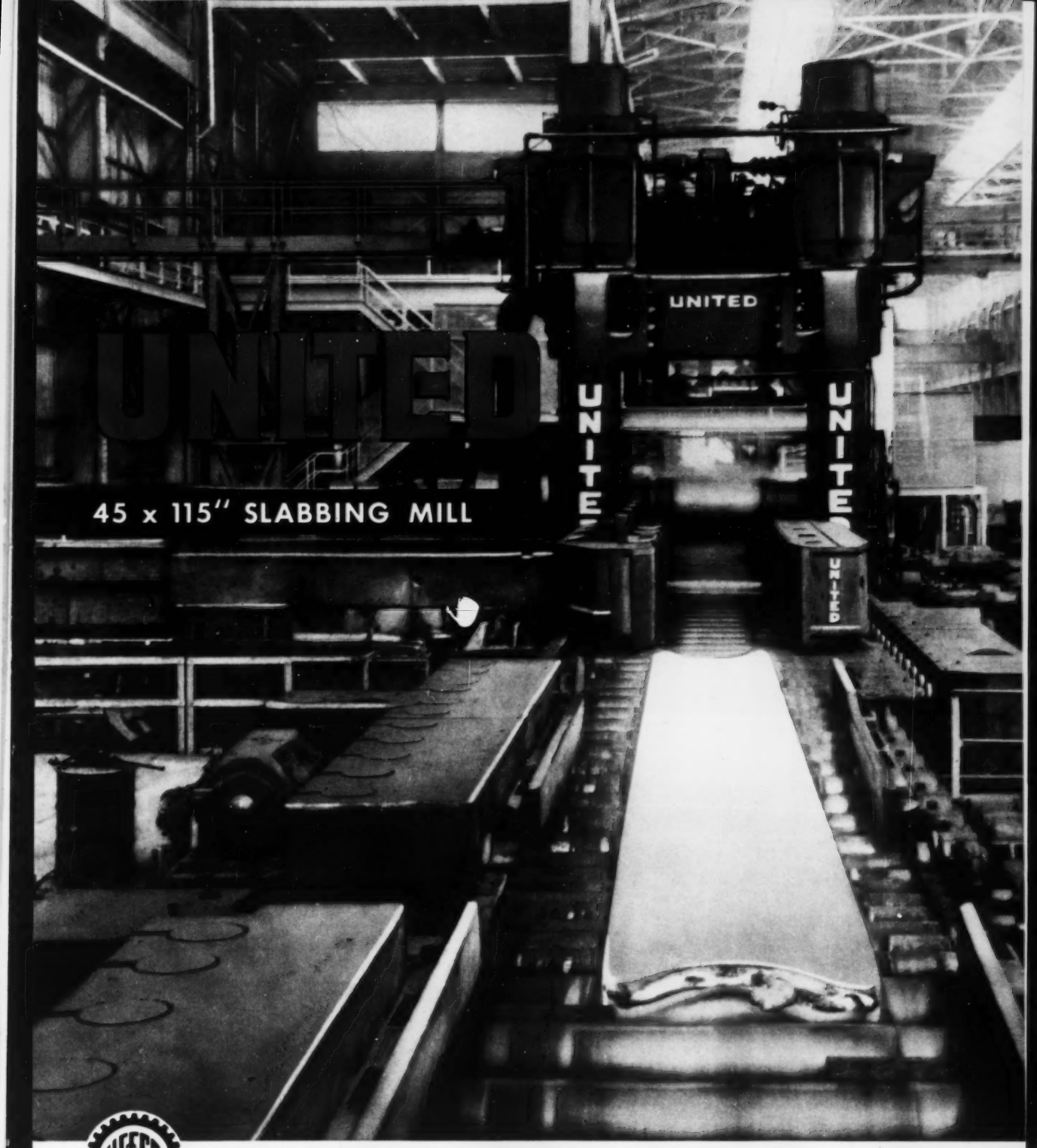
WHAT "ACCO REGISTERED" MEANS

1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring or tag on each sling
6. Signed Registry Certificate with each sling

AMERICAN CHAIN & CABLE
BRIDGEPORT, CONN.

ACCO

Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Wilkes-Barre, Pa., York, Pa.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.



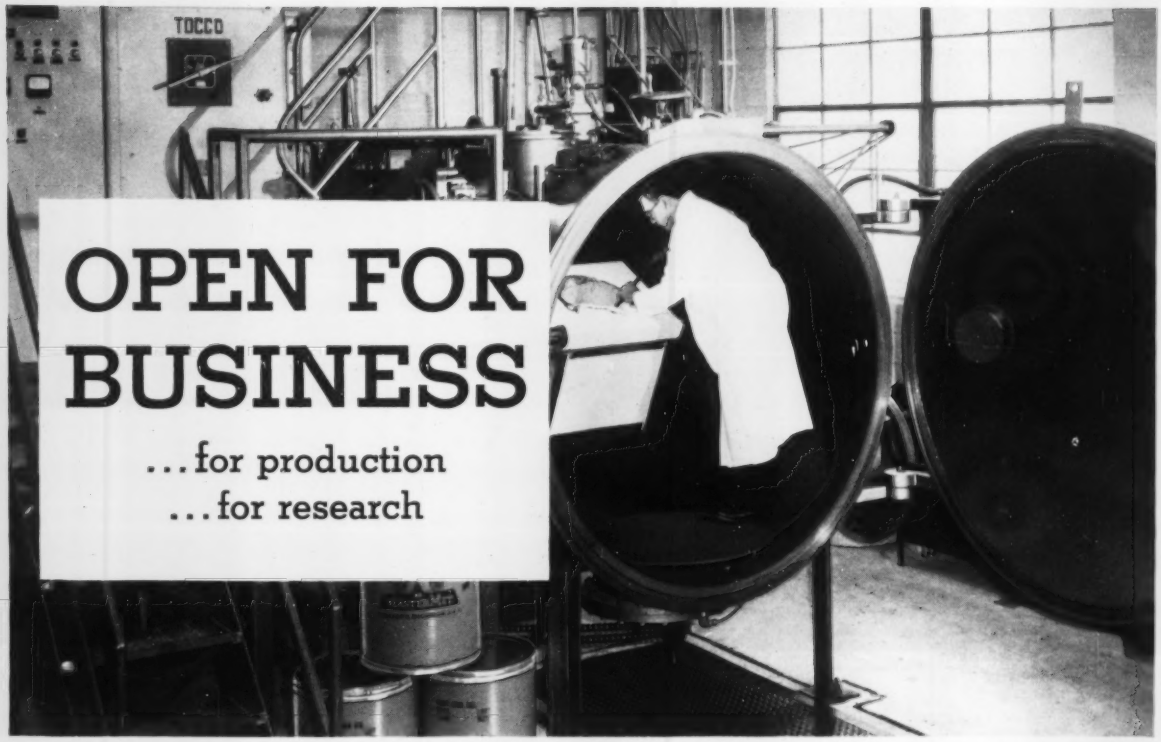
UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington.

SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



OPEN FOR BUSINESS

...for production
...for research

ULTRAMET ALLOYS are processed at less than 10 microns of vacuum, in this latest design vacuum melting furnace — fully equipped for refining and manipulation of the charge under exact time and temperature controls. Result: super-clean, super-strong metals offering you greater tensile strength, ductility and wear life . . . higher electrical and magnetic properties.

Cannon-Muskegon offers complete vacuum-melting facilities for ferrous, nickel- and cobalt-base alloys

NOW AVAILABLE: stainless, tool and die, magnetic steels—high-temperature, corrosion-resistant, low expansion alloys — bearing steels, and alloys for electrical and electronic applications plus special steels.

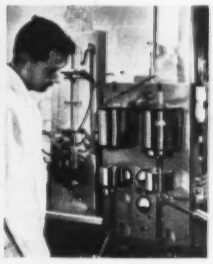
We offer industry:

Materials for remelt and processing— in pounds or tons — under vacuum, conventional air-melting or inert gas processes.

Casting development, including research and experimental facilities for investment, shell mold, dry sand and permanent mold castings.

Ingots, billets and a variety of cast forms — for rolling, forging, extruding or machining.

X-Ray fluorescence spectrometer—the most modern means for rapid and accurate analysis of major elements in alloys — just one of a series of regular evaluations that maintain highest quality control standards.



Precise carbon analysis is another UltraMet test for chemical quality. Additionally, tensile properties, creep tests, Rockwell hardness, bent wire and other tests safeguard perfection throughout production.

MasterMet alloys are produced by air-melting in modern high-frequency furnaces. The chemical analysis of each melt is certified to your specifications — exactly produced to compensate for melting losses.

For full particulars, write for our new bulletin on Vacuum Melting and Air Melting facilities and alloys . . . plus details on new "tight" specs on Armco 17-4PH.

MASTERMET CERTIFIED ALLOYS FOR INDUSTRY

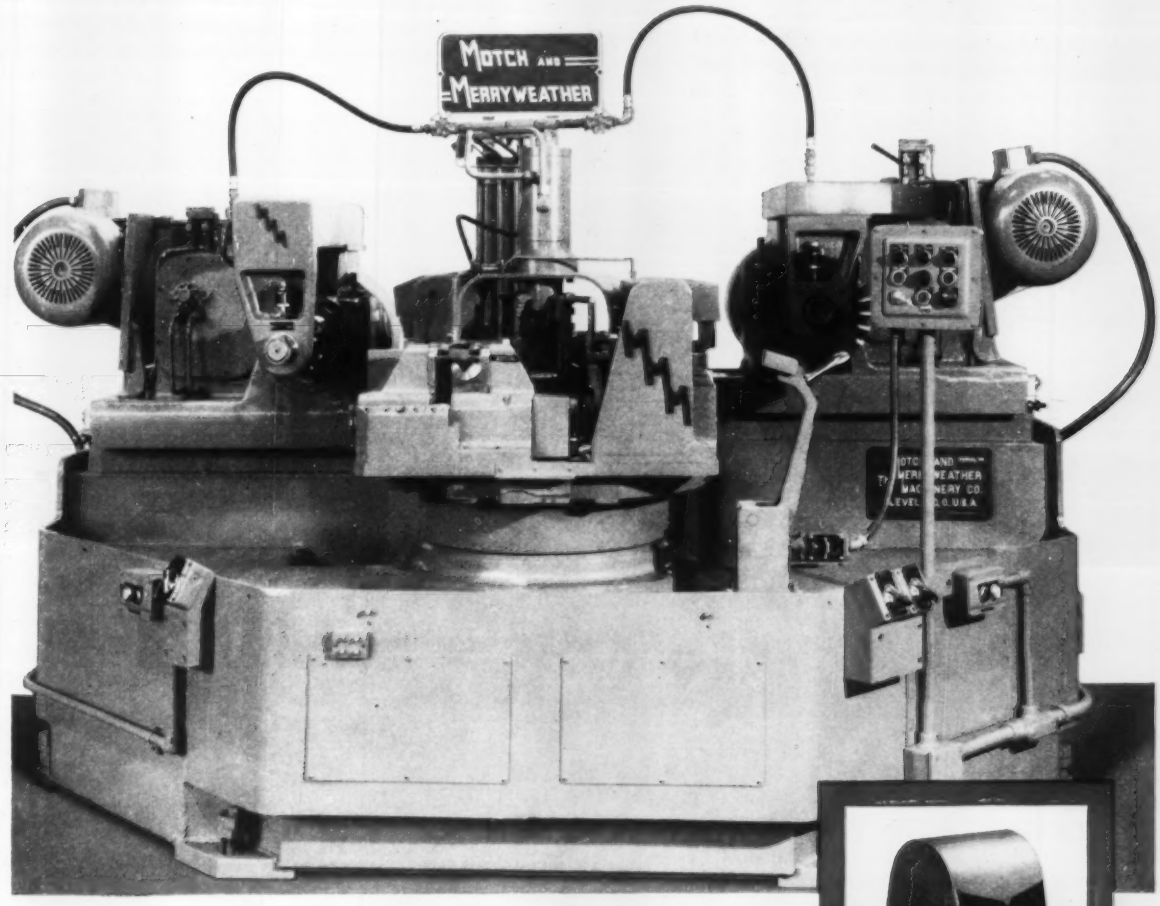
ULTRAMET VACUUM MELTED ALLOYS FOR INDUSTRY

CANNON-MUSKEGON CORPORATION

2893 Lincoln Avenue • Muskegon, Michigan, U.S.A.

METALLURGICAL SPECIALISTS

Another specialized machine by M & M



Special duplex milling machine

for milling and slotting chain links

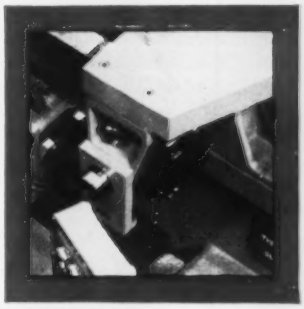
Operation—Straddle and form mill on right hand station, slot or straddle mill on left hand station.

Universal—Six different sized parts run over this machine.

Cycle—Either automatic or manual cycle. Cycle time, 64 seconds.

Feed—Custom-designed and built hydraulic head feed, index and clamp.

Fixtures—Four fixtures are mounted on index table.



Heavy welded steel construction, annealed milling head and rugged, all-helical gear train in heads assure continuous production with a minimum of maintenance and costly downtime.

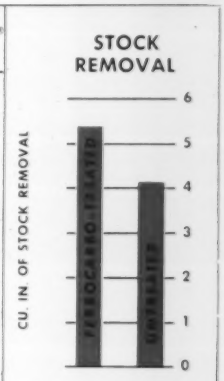
The
MOTCH & MERRYWEATHER MACHINERY
Company
MACHINE TOOL MFG. DIVISION
CLEVELAND, OHIO

PROVED BY INDEPENDENT LABORATORY TESTS:

31.7% S·M·I*

for FERROCARBO®-TREATED IRON

CHEMICAL ANALYSES	UNTREATED	FERROCARBO® TREATED
TC	3.51	3.50
Si	1.96	1.99
P	0.17	0.17
CE	4.16	4.16
Cutting speed (ft./min.)	210	210
Feed (in./rev.)	.009	.009
Depth of cut (in.)	.062	.062
Wear Land (in.)	.005	.005
Vol. of metal removed (cu. in.)	4.1	5.4
Per Cent Improvement		31.7%



* Surface Machinability Improvement
Tool wear tests were conducted with a single point "Carboloy" grade 44A tool on castings machined at commercial speeds. Flank wear was measured with a 20 power microscope.

These extraordinary test results were obtained by an independent research laboratory on unalloyed gray iron cast by a leading Midwest foundry, using untreated and Ferrocarbo-treated iron of identical chemistry.

Castings that are *easier* to machine are *easier* to sell. That's why FERROCARBO Briquettes—the unique patented cupola additive by Carborundum—are used by outstanding foundries everywhere. Tests conducted on FERROCARBO-treated gray iron manufactured by leading foundries all over the country show a machinability improvement factor as high as 73% over untreated gray iron. Now, *premium* castings are assured at *no extra cost* LOOK INTO FERROCARBO TODAY!

WRITE FOR MORE INFORMATION on how FERROCARBO produces more machinable iron regardless of metal composition. Ask for booklet A-1409, Electro Minerals Division, The Carborundum Company, Niagara Falls, N. Y.

ELECTRO MINERALS DIVISION

The CARBORUNDUM Company

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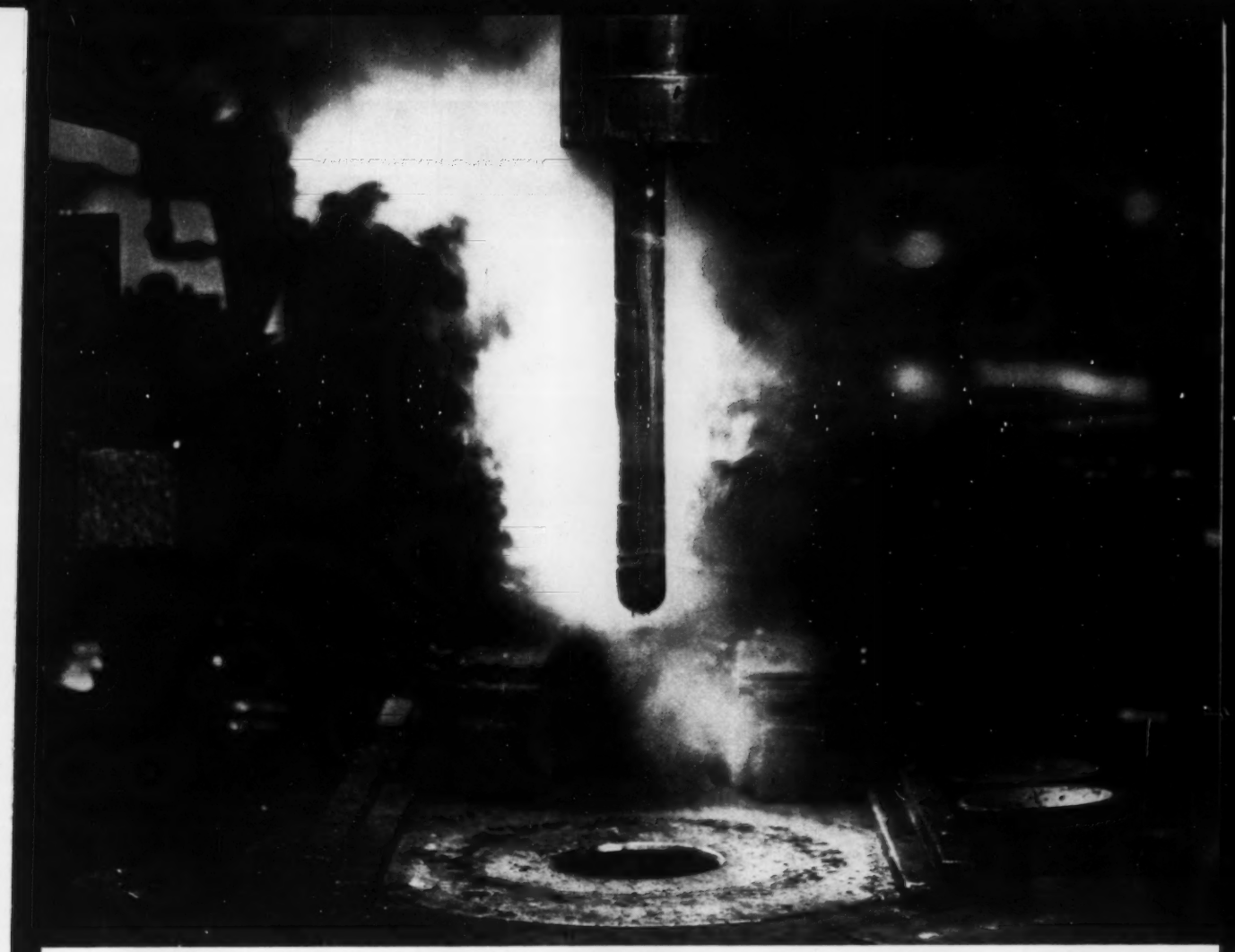


Tough 2½" diameter mandrel at Rc 44 on 1150 ton brass extrusion press. Scovill Manufacturing Co.

Mandrel of HALCOMB 218 retains toughness and hardness at hot work temperatures...

This mandrel is made of Halcomb 218—a tough, air-hardening hot work steel. Halcomb 218 is suitable for tools like this which require a higher degree of toughness at moderately elevated temperatures than is obtainable with the tungsten types of hot work steels. And Halcomb 218 *retains both* its hardness and strength at these temperatures.

For example, at a hardness of Rc 44, Halcomb 218's Charpy Impact Strength is 33 ft-lbs at 500F. And it will retain this hardness after 1 hour, after 10 hours and even after 100 hours at temperatures up to 900F.

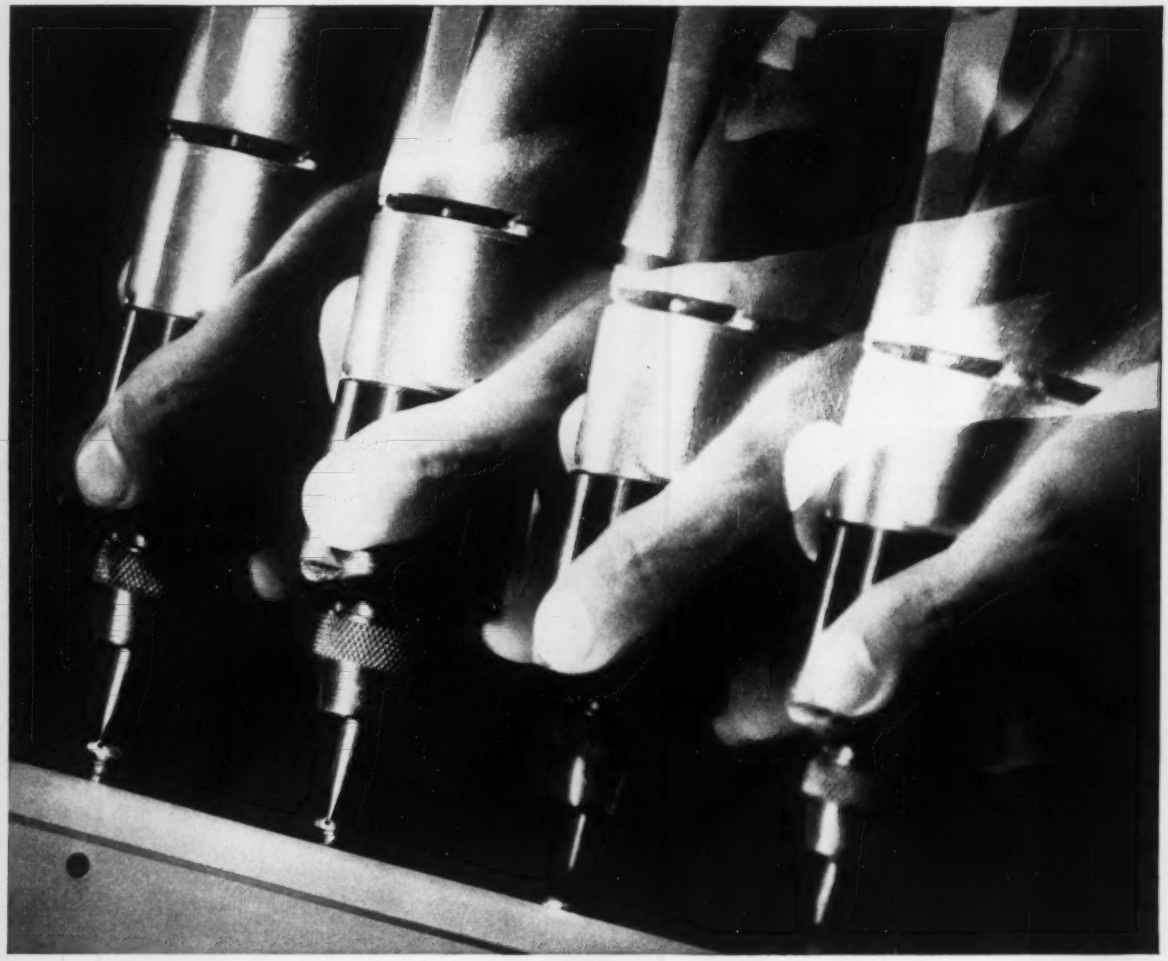
Properties like these cut tooling costs. The mandrel shown above is good for 1200 pushes, for example, and even then all it needs, usually, is repolishing before being used again.

Halcomb 218 is particularly useful for all hot work operations on which drastic coolants are used. It even resists breaking very successfully when water cooled in operation. If these sound like advantages you can use, call your local Crucible representative for more complete data. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor—Railway & Power Engineering Corp., Ltd.



Is assembly one of your largest production costs?

It probably is. Wherever fastenings must be made, this simple truth applies: The cost of the fastener is but a tiny fraction of the cost of using that fastener in production. The key to reduced assembly costs is the fastener that helps high-paid assembly hands turn out better work—*faster*. The P-K® Self-tapping Screw is that fastener!

Using screws that don't come up to P-K standards can raise total assembly costs as much as 25%. Screw failures not only result in assembly slow-downs . . . but in parts spoilage and hidden weaknesses as well. This is especially true in assembly by automation. Uniformity, such as P-K Self-tapping Screws offer, is automation's prime requirement for trouble-free assembly.

Why not talk to a Parker-Kalon Assembly Engineer —a man who is in daily contact with many different assembly set-ups. Perhaps he can show you how to reduce the number of fastenings in your product or how to solve a particularly difficult fastening problem. (That's his business.) Contact him through your local Parker-Kalon distributor.

PARKER-KALON DIVISION, *General American Transportation Corporation*
Manufacturers of Self-tapping Screws, Socket Screws, Screwnails, Masonry Nails, Wing Nuts and Thumb Screws

PARKER-KALON® fasteners

Sold Everywhere Through Leading Industrial Distributors
Factory: Clifton, New Jersey—Warehouses: Chicago, Illinois—Los Angeles, California

A NEW AID FOR COST-CONSCIOUS MANAGEMENT

You can now determine just how much productivity you are losing because one or more elements of the operating cycle of an automated machine are not perfectly timed.

Now you can spot any timing error to within a 60th of a second immediately.

Cycle Analysis

Sheffield's new Monitorecord* system analyzes timing by means of a printed, composite time graph. This shows every start, dwell and stop of each interrelated event in the complex machine cycle – just as it occurs.

Corrective Adjustment

When a Coded Master is laid over the time graph you see just what adjustments are needed and the amount of each. No tedious groping – no costly down-time.

What could serve Preventive Maintenance more effectively than taking such a graph every day? What could save as much set-up time? This system often justifies its cost the first time it is used.

System installation is no problem. It can be applied to machines now in service or it may be built into new machines.

The readily portable Monitorecord is merely plugged into the system receptacle of any machine requiring cycle analysis. It can be moved about at will.

Get all the facts on this profit-conserving idea. Write to the *Sheffield Corporation, Dayton 1, Ohio, U.S.A., Dept. 17.*

the SHEFFIELD corporation

measurement for mankind

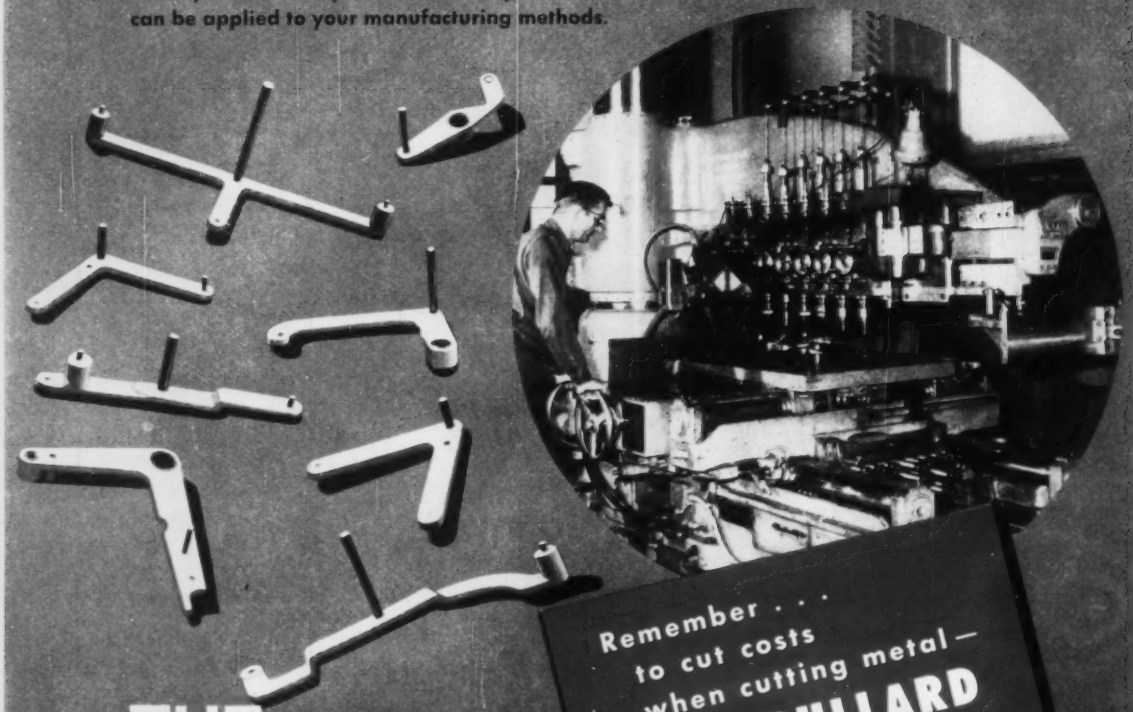
SUBSIDIARY, BENDIX AVIATION CORPORATION

*Trademark

7828

. . . AN 8 TO ONE SAVING WITH BULLARD Spacer Table

is obtained by the Daystrom Instrument, Division of Daystrom Incorporated, Archbald, Pa., on drilling and boring various sized holes with diameter tolerances of ±.0002 and center distances of ±.0005. The major part of this saving is due to eliminating the necessity of making costly drill jigs and boring fixtures for each individual piece or operation. The multiple drill head, with variable speed drive, at Daystrom Instrument, is set up to drill and bore three different diameters on as many as fourteen holes in one set-up. The versatility and accuracy of the Bullard Spacer Table can be applied to your manufacturing methods.



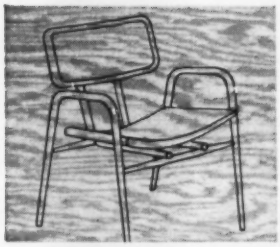
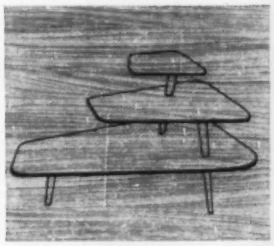
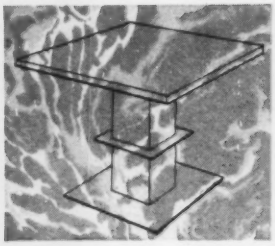
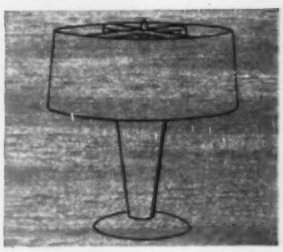
Remember . . . to cut costs when cutting metal— buy BULLARD

THE BULLARD COMPANY

BRIDGEPORT 9, CONNECTICUT

RIGIDIZED TUBING BY STANDARD

customized for you in "1001" patterns

For volume users of tubing—

Hundreds of exciting new patterns in rigidized tubing can be made up to add novel beauty, strength and individuality to your products. Textures and motifs to match fabrics, woods, materials and finishes of all kinds. In round, square, rectangular or special shaped tubing. And manufacturer sharing the cost of design development depending, of course, on volume of order. Custom patterns such as—nubby weaves, rustics, striateds, knotty pine, corrugated, herring-bone, ripple wood, swirls, scrolls, geometrics—can be designed to your specifications. Gleaming chrome or duo-tone enamel finishes. Unlimited pattern designs! Unlimited uses! You are limited only by your own imagination. Sizes range from ½" to 5½" OD in 16 gauge and lighter carbon steel tubing . . . and to 4" OD stainless steel.

Standard also offers full line of carbon and stainless tubing and pipe—for everything from simple *structural* to precision *mechanical* and *pressure* applications.

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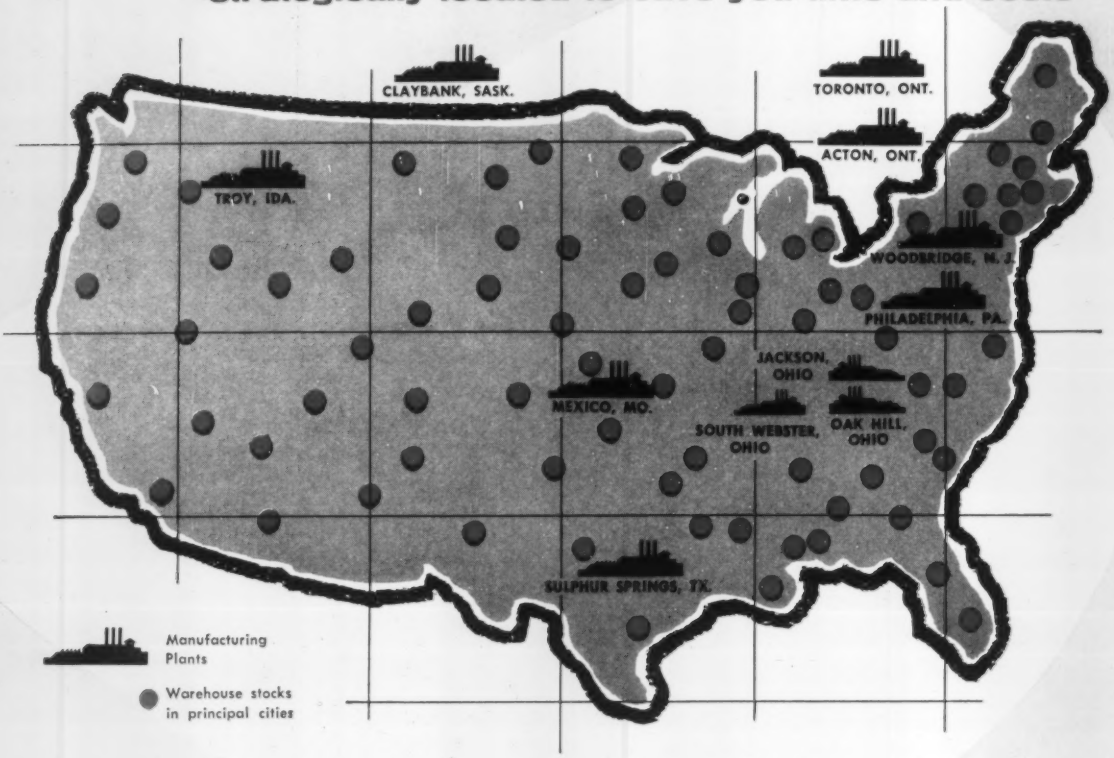
manufacturing and warehouse facilities strategically located to save you time and costs



11 A. P. Green manufacturing plants and warehouse stocks conveniently located throughout the United States and Canada, Save You Money 7 Ways.

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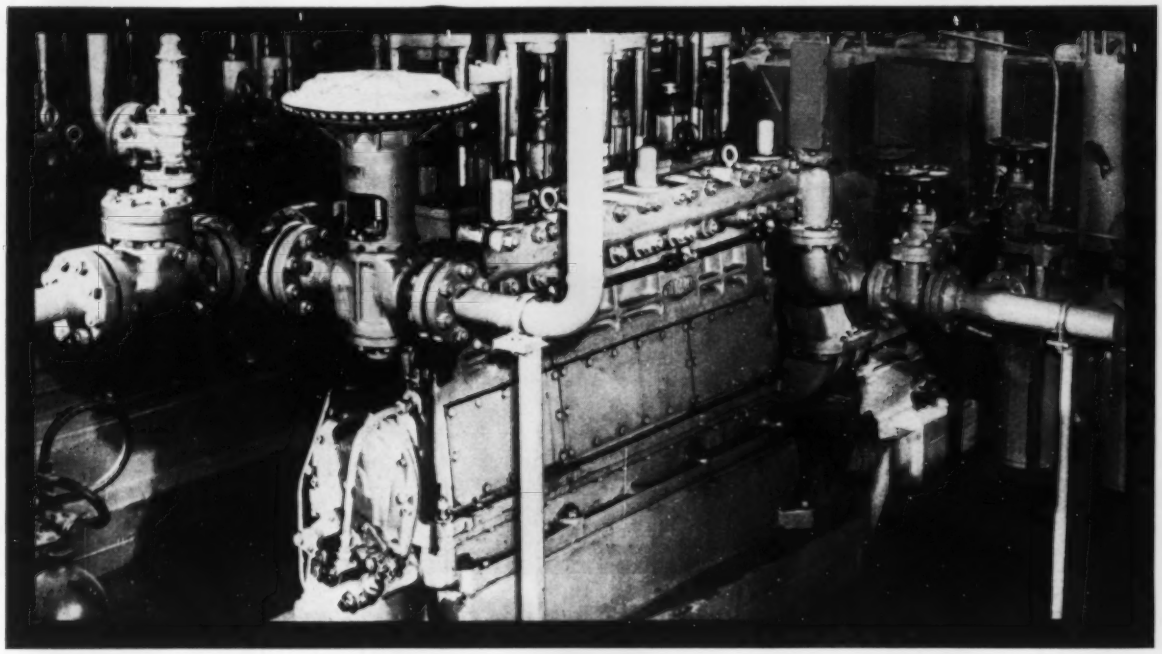
Let Aldrich design and furnish your complete central hydraulic system

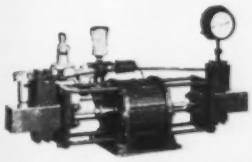
Top performance of central hydraulic systems is a foregone conclusion when you specify Aldrich. By selecting Aldrich to design and supply your complete central hydraulic system, you receive the benefit of unified engineering plus the newest in pumping equipment. With Aldrich pumps you can use either oil or water as a hydraulic medium. If you are expanding your facilities, contact Aldrich Pump Company, 3 Gordon Street, Allentown, Pa. Our engineers will be glad to work with you.



Direct Flow Pumps. Shown above is a central hydraulic system using Aldrich Direct Flow Septuplex Pumps, 2¼ " x 5", 1500 psi, equipped with 200 hp motors.

Aldrich *Direct Flow Pumps* are available from 25 to 2400 hp in pressures to meet your requirements. They are designed to offer complete flexibility in type of drive and drive arrangement. Among units of the same size, all normal wearing parts are interchangeable. Direct Flow Pumps are available in 2½, 3, 5 and 6 inch Stroke Triplex; 5, 6 and 8½ inch Stroke Quintuplex; 5, 6 and 8½ inch Stroke Septuplex; and 5, 6 and 8½ inch Stroke Nonuplex. Write for Data Sheet 100.

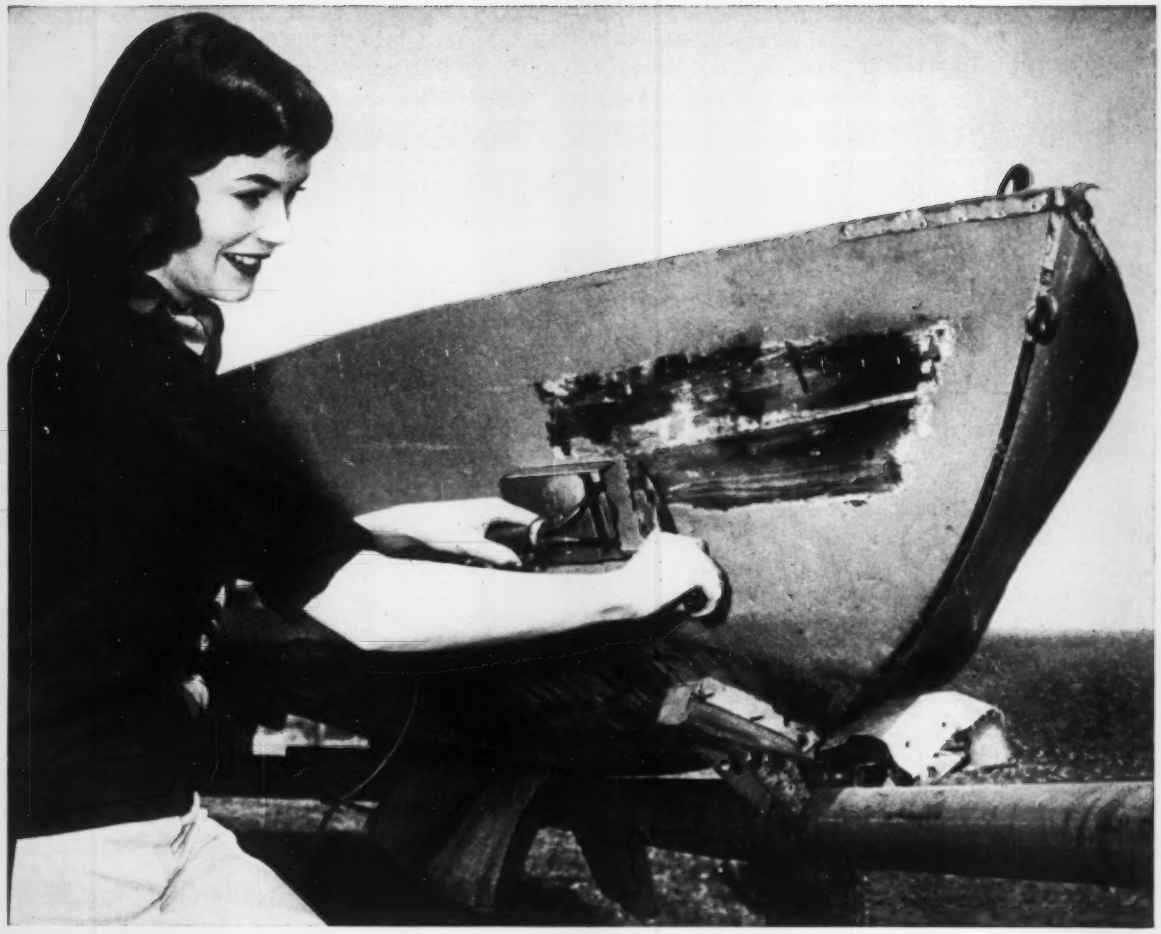
Aldrich-Groff Controllable Capacity "Powr-Savr" Pump. The "Powr-Savr" is a variable stroke, constant speed, vertical triplex pump. It provides stepless, straight line control of capacity from zero to rated output without requiring change of speed from power source. Available in 2" through 6" stroke sizes, ranging in power from 5 to 125 hp. Write for Data Sheet 65A.



Aldrich Horizontal Air Driven Hydraulic Pump. The Aldrich Air Driven Hydraulic Pump will deliver any pressure up to 30,000 psi from ordinary 90 psi plant air—without auxiliary equipment. It is self-contained, complete with regulator, air filter, lubricator and pressure gauge.

Design provides economy of operation for many industrial applications—supplying power for molding and belt presses; testing tubing, valves or pressure vessels. Ideal for laboratory or production use. Data Sheet 36.

the toughest pumping problems go to ALDRICH



Paint removing tool made with nickel alloy:

Easy way out of a tough scrape

This pretty miss has waded into a job that strong men often shun.

But don't worry. With that electric paint remover, she won't raise a single blister – except on paint.

She needs no clumsy scraper. No messy chemicals or flaming blowtorch. Within minutes after she plugs into a 110-volt line, old paint is done for. She blisters it . . . softens it . . . and lifts it off with her putty knife. *No difficulties here.*

Nor, for that matter, were there difficulties on the development end. The designers of this tool simply adapted an idea that has long been used on electric ranges and other heating appliances. *They put the heating element inside a tube of Incoloy* iron-nickel-chromium alloy.*

Incoloy protects the thin nickel-chromium resistance wire against the destructive knocks and slams of use. A standout performer at high temperatures, Incoloy resists warping . . . cracking . . . corrosion . . . "burning up." It's just what the manufacturers knew they needed to assure a long-lived product for do-it-yourselfers and professionals.

Do you have a metal problem? Then look into the Inco Nickel Alloys. Their properties and applications are described in a useful booklet, *Standard Alloys for Special Problems.* Write for a copy. After reading it, you may want some specific help. We're ready to give that, too . . .

All ***INCO PLUS SERVICES*** are yours for the asking: Corrosion Engineering • High Temperature Engineering • Fabrication Help • Casting Information • Field Information Centers • Convenient Sales and Service • Technical Publications. You are welcome to all the information and help we can give you whenever you are looking for answers to your metal problems.

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Nickel Alloys Perform Better, Longer

STEEL
September 16, 1957

Metalworking Outlook

Next Step in Steel Merger Case

Another step in the most important industrial legal battle of this decade will be taken today (Sept. 16). Bethlehem Steel Corp. and Youngstown Sheet & Tube Co. will file affidavits in federal court, Southern District of New York, showing why their merger would not reduce competition in the steel industry. Briefs will be exchanged in the next few weeks. Oral arguments by both sides will be heard beginning Nov. 4. The court's decision may come by December. If the U. S. wins, the matter will be carried to the Supreme Court by the defense. If the U. S. loses, it can demand a trial. In either event, the final decision won't come until 1959.

Armco Develops New PH Steel

Armco Steel Corp. has developed PH-15-7-Mo, a high strength stainless steel that will permit future aircraft and missiles to attain supersonic speeds without damage from air friction heat. Its cost is less than one-tenth that of high strength titanium alloys, says R. L. Gray, Armco president. Average price will run $2000 to $2200 a ton. The company is spending $70 million for improvement and expansion of its Butler, Pa., works to speed production of this and other special steels. About $75 million worth of stainless went into aircraft and missiles in 1956.

Purchasing Agents Report

Chicago purchasing agents report: Deliveries are good. Prices continue to rise. Inventories are stabilizing. Factory employment is slipping. Production is leveling out. Order backlogs are declining slightly.

Employment Dips

Employment fell to 66.4 million at mid-August from the record level a month before. At the same time, unemployment also declined, to 2.6 million, largely because students stopped their search for summer work. Although the job decline is not serious, normally there's a seasonal upturn in employment during August. Gains were registered in 1954, 1955, and 1956.

Construction Levels Off

The physical volume of new construction is off a little from what it was a year ago. Because of inflation, the dollar volume on a seasonally adjusted basis for the first eight months hit an annual rate of $46.8 billion, compared with expenditures of $46.1 billion for 1956. Public building shows the biggest gains over the 1956 pace.

SUB and Ohio

Look for a test case in the courts on the steel industry's methods of getting around Ohio's administrative ruling against payment of Supple-

Technical Outlook—p. 129 Market Outlook—p. 191

mental Unemployment Benefits with state jobless pay. The ruling is specifically against the automotive SUB. The steel industry and the steel union take advantage of that technicality to make SUB payments. About 114,000 steelworkers are employed in Ohio. Layoffs have been light, so payments are low. In three other problem states—Indiana, Virginia, and North Carolina which have about 76,000 union members—other methods will be used to get around SUB barriers.

State Jobless Benefits Up

Out-of-work benefits were raised in half the states this year, says Commerce Clearing House. Some 23 states boosted the maximum benefits by an average of $5 a week, and one other state provided a larger total by increasing the duration of payments. Meaning to industry: SUB payments will be proportionately lower in the states affected.

Teamsters Vs. AFL-CIO

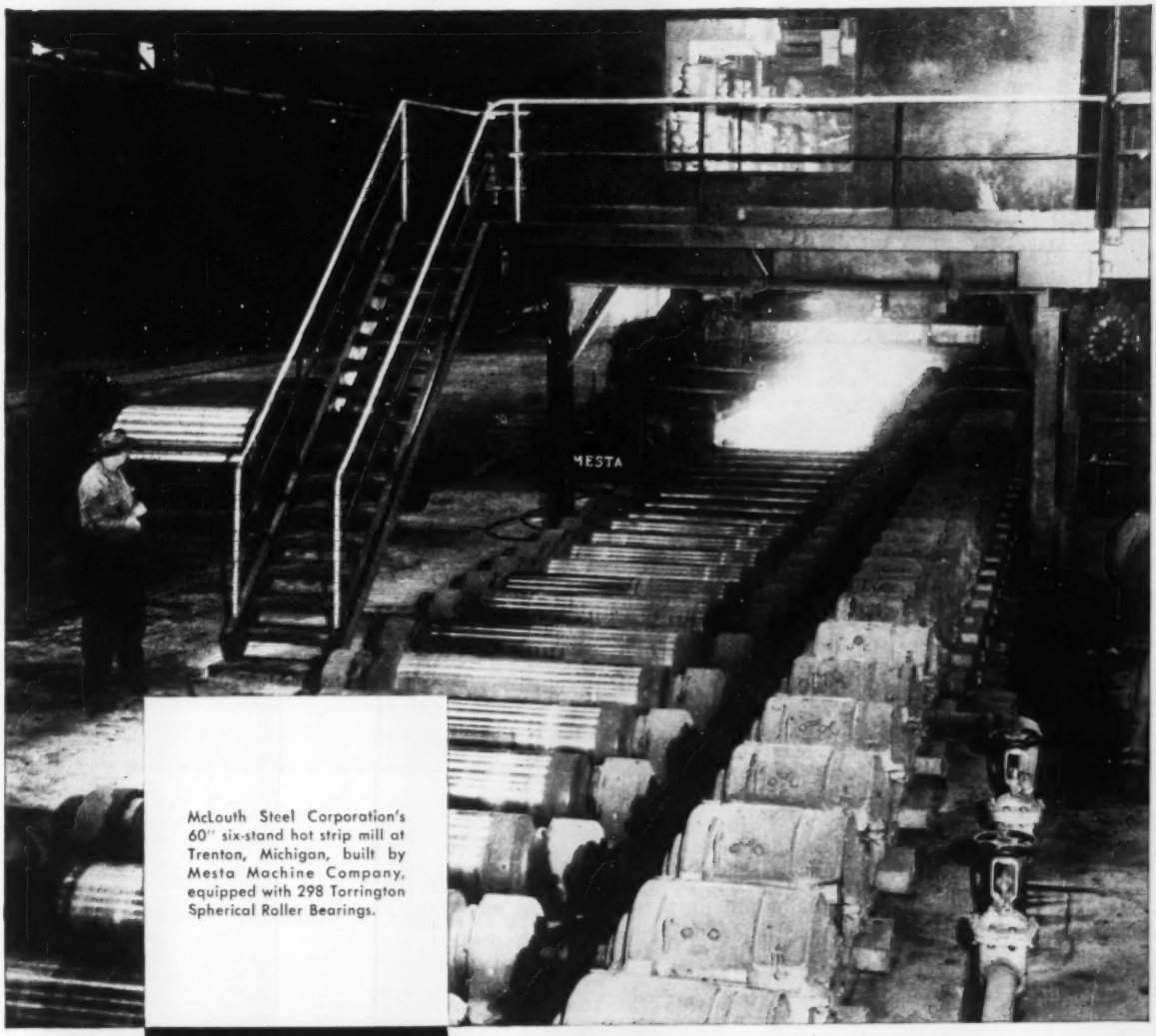
James Hoffa's chances of becoming president of the Teamsters Union are still good, despite publicity about opposition in the West. Mr. Hoffa already has enough delegates lined up to assure election at the convention which begins Sept. 30 at Miami, Fla. Watch for these Teamster-AFL-CIO developments: The federation's Ethical Practices Committee will recommend to the AFL-CIO executive council that the Teamsters be suspended. The council, at a special meeting Sept. 24-25, will vote suspension. It will be lifted if Mr. Hoffa fails to be elected and the Teamsters make some show of cleaning house at their convention. Otherwise, the suspension will hold until the federation's December convention. Then, a vote will come on reinstating the Teamsters or kicking them out.

Cooling Airborne Electronics

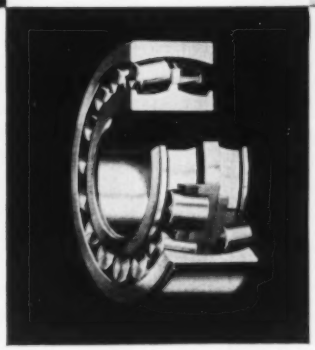
After a year of testing, Martin Co., Baltimore, thinks it has the answer to cooling electronic equipment inside airplanes or missiles traveling at Mach 5 (temperatures up to 700° F are developed). The system envelops electronic components in a water jacket. While outside temperatures rise, the equipment inside stays at the temperature of boiling water. Evaporative cooling, says Martin, "will surpass the best systems now in use."

Straws in the Wind

Sen. John L. McClellan (D., Ark.) still hasn't decided whether to investigate the United Steelworkers regarding alleged election irregularities last February . . . United Auto Workers' Public Review Board, watchdog of manners and morals, is now operating and has a big batch of cases, particularly concerning nine officials who used the Fifth Amendment at Senate hearings . . . Top executives earned 5.1 per cent more pay in 1957 than they did in 1956, says McKinsey & Co., management consultant.



McLouth Steel Corporation's 60" six-stand hot strip mill at Trenton, Michigan, built by Mesta Machine Company, equipped with 298 Torrington Spherical Roller Bearings.



Self-driven table rolls mean drastic cut in mill down time!

It was a new idea. Suppose mill approach and runout table rolls had their own independent motors and pillow blocks instead of conventional gearing and line shafts? Then any roll could be removed for maintenance and replaced immediately by a stand-by assembly without shutting down the whole table for hours!

Torrington engineers, working with Mesta engineers, came up with a design mounting Torrington Spherical Roller Bearings in Torrington-built fixed and floating pillow blocks. These bearings compensate for misalignment across the table and for dynamic deflection of the rolls under load. In both roughing and finishing mill tables, 298 Torrington Spherical Roller Bearings have been operating efficiently since 1954!

The Torrington Company, with experience in the manufacture of every major type of anti-friction bearing, has made thousands of installations in steel mill equipment that have helped roll record tonnages. Your Torrington engineer is an expert: call on him when you need help. *The Torrington Company*, South Bend 21, Ind. – Torrington, Conn.

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Special Armco Steel Cuts Painting Costs,

Makes Your Products Look Better Longer

Mill-Bonderized Armco Cold-Rolled PAINTGRIP® Steel helps streamline painting schedules, produces smoother, more durable paint finish.

If you use painted sheet metal in your products, you'll be interested in the cost-cutting and sales-boosting advantages offered by Armco Cold-Rolled PAINTGRIP. Both service records and exposure tests prove its superiority over ordinary cold-rolled steel for parts that must be painted. The reason is this special steel is given an electrolytic "flash" of zinc and then Bonderized at the mill. It is designed specifically to take paint and hold it longer.

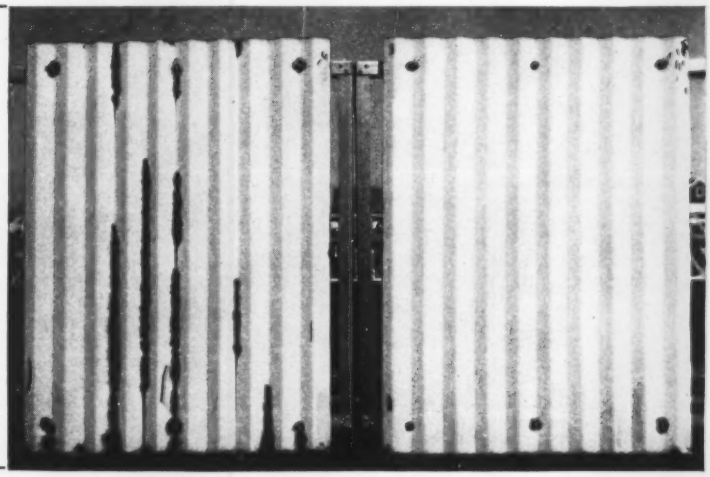
Combination of Advantages

The special paint-holding surface of Armco Cold-Rolled PAINTGRIP offers you a combination of advantages that make possible easier fabrication and improved product performance.

- **Easy to Fabricate—Can be readily formed, drawn, welded and soldered. Surface remains intact during drawing or forming.**
- **Simplifies Painting—Cold-Rolled PAINTGRIP is ready to paint. Surface treatment eliminated and paint easier to apply. On interior unexposed surfaces, mist-primer coat may be eliminated.**
- **Resists Rusting in Storage—Not recommended for use unpainted but can be stored inside as sheets, coils or semi-finished parts without rusting. Cuts cleaning costs.**
- **Longer Paint Life—Helps assure uniformly smooth paint finish that lasts several times longer than paint on untreated cold-rolled steel.**

Consider Armco Cold-Rolled PAINTGRIP for *your* products. Its many advantages may help you cut finishing costs and add new customer-appeal. This paint-preserving Armco Steel is produced in sheets and coils in 12 to 28 gage. Write us today for complete information.

Results of two years in an industrial atmosphere. Same paint schedule for both panels. Scratched to accelerate flaking. Left—Untreated Cold-rolled steel. Right—Armco Cold-Rolled PAINTGRIP.



ARMCO STEEL CORPORATION

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SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

11 More Fairless Works!

In surveying the expansion program of the steel industry, the editors of STEEL find that 7.6 million tons of capacity are being added during 1957. Next year, another 5.3 million tons will go in.

Post-Korean expansion, 1955 through 1958, will total 20.5 million tons. On Jan. 1, 1959, the industry will be able to turn out steel at the rate of 146 million tons a year.

For the years after 1958, the editors were able to turn up plans for the addition of only 1.2 million tons of capacity. At first blush, it would appear that the steel industry is reaching a plateau in its growth.

We don't think so.

In recent years, steel expansion has been coming in waves. From 1941 through 1944, 11.3 million tons were brought in to satisfy bulging war requirements. When the war ended, the steel industry could make a record 95.5 million tons a year.

Postwar, 1946 through 1950, about a half billion dollars a year were spent in replacing obsolete facilities and in bringing capacity up to 100 million tons on Jan. 1, 1950.

The real surge, of course, was induced by the Korean War. It reached its crest in 1952 when 8.9 million tons were added. On Jan. 1, 1955, capacity had reached 125.8 million tons—a gain of 25.8 million tons in four years.

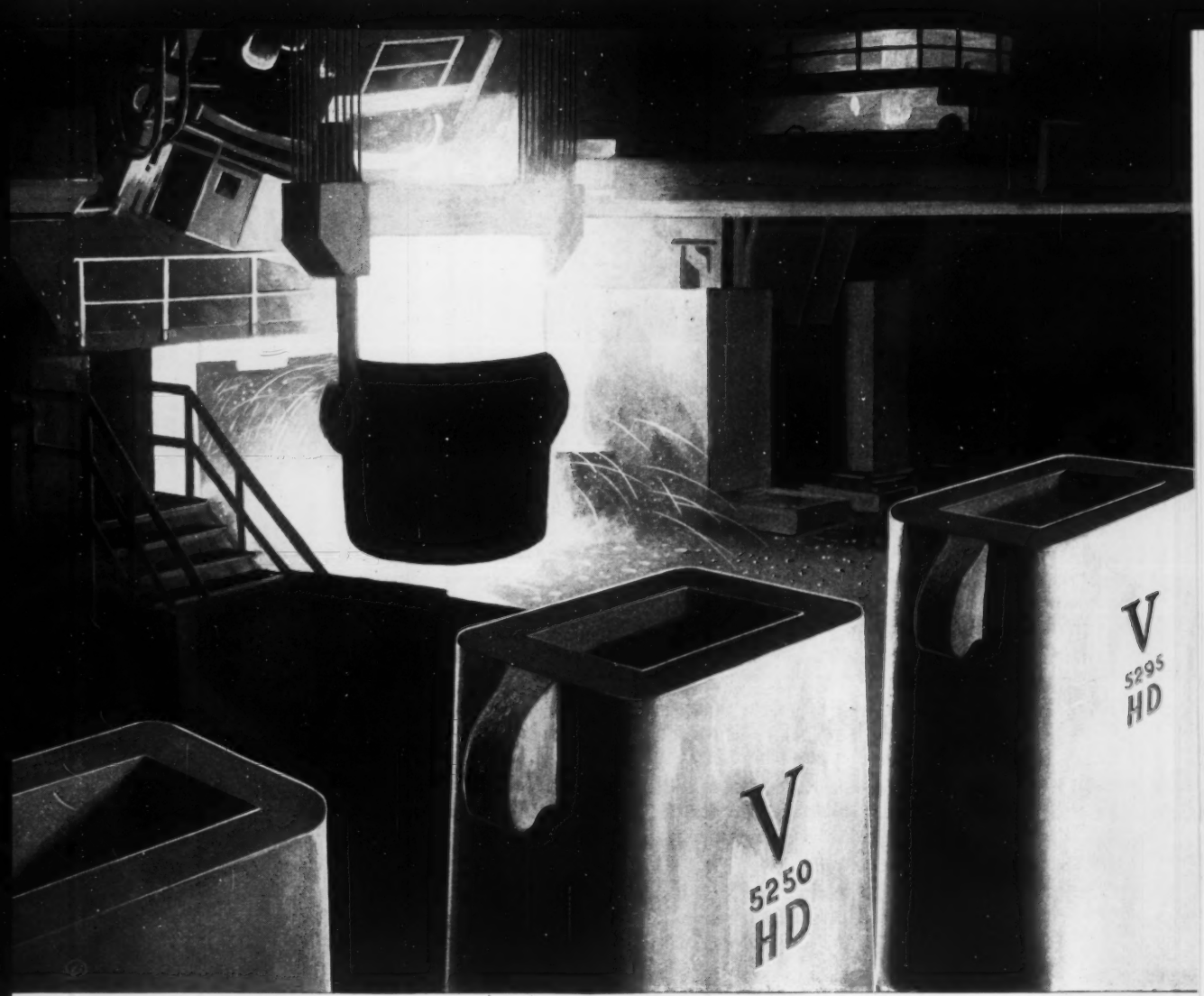
The most recent wave of expansion now reaching its crest is based on what the steel industry believes are the requirements of a nation at peace.

Those requirements will continue to grow. Prewar capacity was 1235 lb per person. By 1955, it had increased to 1520 lb. It's now 1560 lb.

We don't think it is unreasonable to assume that a minimum of 1800 lb per capita will be needed when we have a population of 190 million in 1965. That means another 25 million tons of capacity must be built when the next expansion wave comes in the 1960s.

That's 11 more Fairless Works!

Irwin H. Such
EDITOR-IN-CHIEF



All ingot moulds by Valley are designed for individual steel plant conditions. These moulds have been proven the highest quality available to the steel producing industry today.

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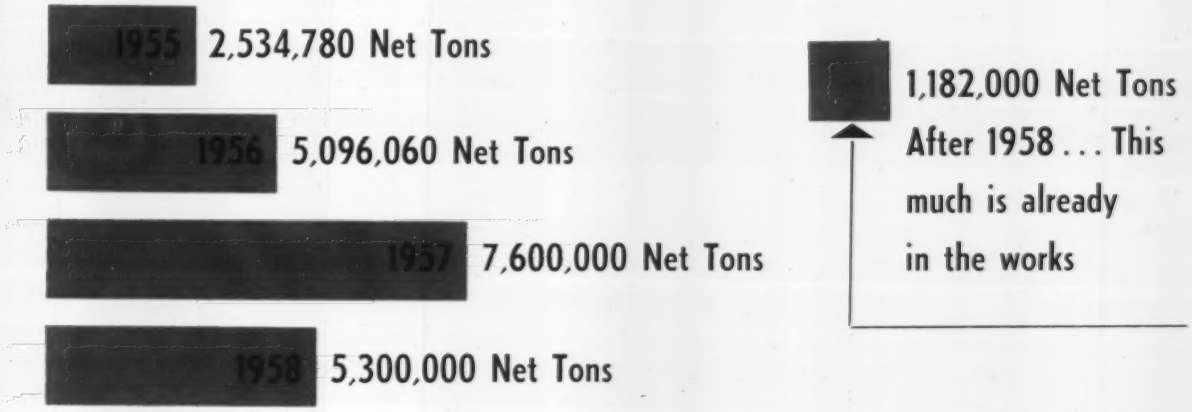
How U. S. Steelmaking Capacity Is Growing:



Addition of 7.6 million ingot tons this year will push national capacity up to 141 million tons on next Jan.1. Another 5.3 million tons will be completed in 1958

THIS YEAR is bringing the biggest increase yet in the current round of steel capacity expansion.

Coming in are 7.6 million net tons of facilities to melt steel. This means that on next Jan. 1 there will be a national capacity of around 141 million net tons, a 5.6 per cent increase over the 133,459,150 tons existing on last Jan. 1. This presumes there will be no extensive retirements beyond those allowed for. (For details of the increases, see Page 80.)

The current round of steel expansion began in the autumn of 1955. At the start of that year, the country had 125,828,310 net tons of capacity to make steel for ingots and castings. In 1955, the addition totaled 2,534,780 tons. In 1956, it was 5,096,060 tons.

What 1958 Will Bring—During 1958, additions will come to 5.3 million net tons, which will put national capacity up to around 146 million tons on Jan. 1, 1959.

After 1958—Expansions underway or announced for completion after 1958 total 1,182,000 tons. Undoubtedly, the final figure will be bigger. Colorado Fuel & Iron Corp., Denver, for instance, is working on plans which could result in a substantial increase in the company's capacity in 1959.

Another increase (800,000 annual ingot tons) is planned by Barium Steel Corp., New York. It proposes to build an integrated plant on the Delaware River in Burlington County, N. J. The company, which hopes to get started on the plant this fall, contemplates a 1700 ton a day blast furnace, auxiliary equipment, and oxygen conversion facilities.

More To Use Oxygen—Installation of oxygen converters by Barium would bring to five the number of U. S. companies using this process. McLouth Steel Corp., Trenton, Mich., is using it now. Installing it are: Jones & Laughlin Steel Corp., Aliquippa, Pa.; Kaiser Steel Corp., Fontana, Calif.; and Acme Steel Co., Riverdale, Ill. Two other companies on the North American continent are using it: Dominion Foundries & Steel Ltd., Hamilton, Ont., and Algoma Steel Corp., Sault Ste. Marie, Ont.

New Name—The oxygen converter process has been renamed the "L-D Process" by the Kaiser Engineers Div. of Henry J. Kaiser Co., Oakland, Calif. (Kaiser Engineers holds the exclusive U. S. patent licensing rights for the process.) The change was made to eliminate confusion of this process with others using oxygen. L-D is the abbreviation for the Linz-Donawitz process, developed in Austria.

Cost Cutter—L-D is looked to as a way of holding down the cost of installing steelmaking capacity. Construction of an integrated steel plant using open hearth furnaces costs between $250 and $300 a ton of annual ingot capacity. Acme Steel, which is installing two L-D units (converters), says its cost will be $51 per annual ingot ton. Its plant will have 450,000 annual

STEEL INGOT CAPACITIES: Where They're Being Increased

Company	Place of Expansion	Ingot Expansion (Net tons) 1957	1958	After 1958
U. S. Steel Corp.	Pittsburgh District	225,000	445,000	
	Chicago District		1,300,000	
Bethlehem Steel Co.	Bethlehem, Pa.	250,000*		
	Lackawanna, N. Y.	300,000*		
	Sparrows Point, Md.	2,000,000*		
Bethlehem Pacific Coast Steel Corp.	Seattle	174,000*		
Republic Steel Corp.	Chicago	305,000		
	Cleveland	500,000		
	Gadsden, Ala.	408,000		
	Warren, Ohio	408,000		
Jones & Laughlin Steel Corp.	Aliquippa, Pa.	400,000		
	Cleveland	500,000		
	Warren, Mich. (formerly Rotary Electric Steel Co.)	300,000		
Youngstown Sheet & Tube Co.	East Chicago, Ind.	194,000*		
	Youngstown	280,000*		
National Steel Corp.				
Great Lakes Steel Corp.		650,000[1]		
Weirton Steel Co.		150,000[1]		
Armco Steel Corp.	Middletown, Ohio	216,000		
Sheffield Div.	Houston	60,000		
Inland Steel Co.	East Chicago, Ind.	800,000		
Colorado Fuel & Iron Corp.				(†)
Sharon Steel Corp.	Farrell, Pa.		84,000	
Kaiser Steel Corp.	Fontana, Calif.		1,400,000	
McLouth Steel Corp.	Trenton, Mich.	194,000	238,000	
Pittsburgh Steel Co.	Monessen, Pa.	120,000	120,000	
Granite City Steel Co.	Granite City, Ill.		240,000	144,000
Barium Steel Corp.	Burlington County, N. J.			800,000
Lukens Steel Co.	Coatesville, Pa.		25,000	156,000 to 180,700
Lone Star Steel Co.	Lone Star, Tex.		150,000	
Laclede Steel Co.	Alton, Ill.	50,000		
Acme Steel Co.	Chicago		450,000	
Erie Forge & Steel Corp.	Erie, Pa.		96,000	24,000
Baldwin-Lima-Hamilton Corp. Standard Steel Works Div.	Burnham, Pa.	18,750		
Universal-Cyclops Steel Corp.	Coshocton, Ohio			50,000[2]
Eastern Stainless Steel Corp.	Baltimore	45,000		
Latrobe Steel Co.	Latrobe, Pa.			8,000
Firth Sterling Inc.	McKeesport, Pa.		1,100	
Totals		6,773,750[3]	4,549,100[3]	1,182,000

*STEEL's estimate. †Substantial increase contemplated for 1959. 1. By end of first quarter, 1958. 2. In 1959. 3. Does not include 1,774,000 net tons of capacity coming in over 1957-1958 but which cannot be pinpointed as to year.

ingot tons of capacity and will cost $23 million.

Barium Steel is planning 800,000 annual ingot tons of capacity at a cost of $50 million, a $63 a ton rate.

A requisite for use of L-D is an adequate supply of molten pig iron. Acme will assure this by using two iron producing cupolas. Using steel scrap, cold pig iron, coke, and limestone, they will make 1200 tons of iron a day. Barium Steel will make its molten iron in its new blast furnace.

Record Expenditure—The magnitude that costs have reached in building and replacing steel plants is reflected by the American Iron & Steel Institute's estimate that the iron and steel industry in this country will spend a record $1.7 billion this year for new equipment and construction. It tops the record $1.2 billion spent last year. Expenditures in 1955 were $730 million.

Incentives—One of the reasons the industry is expanding is to take care of the needs of an expanding population. This country's population is growing at a rate of 2.8 million a year. In 1960, we will have 180 million people. At that time, too, there will be an increase in the formations of families: People born in the big wave of births in the 1940s will start getting married. The additional families will need houses and equipment for them, and they will take steel.

Another reason for the steel industry's expansion and updating is to provide the increasing amounts and improved types of steel needed to further the progress in electronics, jet planes, missiles, powerplants, and automation.

The steel industry's expansion will not be limited to ingot capacity. Many companies are rounding out their finishing capacities to balance with their steelmaking capacities (see Pages 90-91).

Changing Times—One company that is updating its capacity is Inland Steel Co., Chicago. It is expanding its facilities to make wide flange beams and discontinuing the production of steel rails. Wide flange beams have been in growing demand, while the reverse is true for rails. Inland says: "Our studies indicate that there is an excess of capacity in the country for rail production now and in the foreseeable future." Inland's multimillion program, scheduled for completion in the first half of 1959, will lift its wide flange beam capacity to 54,000 tons a month. The company is now turning out 22,000 to 28,000 tons of wide flange beams a month.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Company by Company Expansion in Steel Industry—1955 to 1957

	Ingot Capacities (Net tons) Jan. 1, 1957	Jan. 1, 1955	—Change— Net tons	Per cent
Acme-Newport Steel Co.	608,000	.....	A	....
Alan Wood Steel Co.	800,000	625,000	+175,000	+28.0
Alco Products Inc.	105,160	103,000	+2,160	+2.1
Allegheny Ludlum Steel Corp.	864,200	864,200	0	0
American Compressed Steel Corp.	21,600	21,600	0	0
Armco Steel Corp. (Total)	5,950,000	4,950,000	+1,000,000	+20.2
Armco Steel Corp.	3,850,000	3,216,000	+634,000	+19.7
Sheffield Div.	2,100,000	1,734,000	+366,000	+21.1
Atlantic Steel Co.	400,000	300,000	+100,000	+33.3
Babcock & Wilcox Co.	229,450	229,450	0	0
Baldwin-Lima-Hamilton Corp.	169,960	169,960	0	0
Barium Steel Corp. (Total)	895,360	886,600	+8,760	+1.0
Industrial Forge & Steel Corp.	48,600	48,600	0	0
Phoenix Iron & Steel Co.	846,760	838,000	+8,760	+1.0
Berkman Co., Louis				
Ohio River Steel Div.	136,080	136,080	0	0
Bethlehem Steel Corp. (Total)	20,500,000	19,100,000	+1,400,000	+7.3
Bethlehem Steel Co.	19,500,000	18,200,000	+1,300,000	+7.1
Bethlehem Pacific Coast Steel Corp.	1,000,000	900,000	+100,000	+11.1
Borg-Warner Corp.	164,000	164,000	0	0
Braeburn Alloy Steel Corp.	20,730	20,730	0	0
Byers Co., A. M.	90,000	75,000	+15,000	+20.0
Cabot Shops, Inc.	14,500	12,000	+2,500	+20.8
Cameron Iron Works Inc.	58,800	58,800	0	0
Carpenter Steel Co.	86,600	85,800	+800	+0.9
Colorado Fuel & Iron Corp.	2,829,500	2,471,500	+358,000	+14.5
Columbia Tool Steel Co.	6,600	6,600	0	0
Continental Steel Corp.	420,000	394,000	+26,000	+6.6
Copperweld Steel Co.	660,000	618,380	+41,620	+6.7
Crucible Steel Co. of America	1,423,400	1,351,400	+72,000	+5.3
Detroit Steel Corp.	1,500,000	1,290,000	+210,000	+16.3
Disston & Sons Inc., Henry	.....	25,000	B	....
Eastern Stainless Steel Corp.	50,000	32,000	+18,000	+56.2
Edgewater Steel Co.	117,600	89,890	+27,710	+30.8
Empire Steel Corp.	500,000	500,000	0	0
Erie Forge & Steel Corp.	234,000	234,000	0	0
Finkl & Sons Co., A.	33,600	33,600	0	0
Firth Sterling Inc.	20,040	20,040	0	0
Ford Motor Co.	1,877,400	1,755,000	+122,400	+7.0
Granite City Steel Co.	1,200,000	1,290,000	−90,000	−7.0
Harrisburg Steel Co.	100,750	100,750	0	0
Heppenstall Co.	55,550	55,550	0	0
Hoster Steel Corp.	12,000	12,000	0	0
Inland Steel Co.	5,500,000	5,000,000	+500,000	+10.0
International Harvester Co.	1,200,000	1,000,000	+200,000	+20.0
Isaacson Iron Works	102,000	102,000	0	0
Jessop Steel Co.	35,740	33,490	+2,250	+6.7
Green River Steel Corp	183,190	198,000	−14,810	−7.5
Jones & Laughlin Steel Corp.	6,600,000	6,166,500	+433,500	+7.0
Stainless Steel Div.	300,000	.....	C	....
Joslyn Mfg. & Supply Co.	37,500	37,500	0	0
Judson Steel Corp.	76,500	76,500	0	0
Kaiser Steel Corp.	1,536,000	1,536,000	0	0
Keystone Steel & Wire Co.	450,000	425,000	+25,000	+5.9
Kilby Steel Co.	34,020	34,020	0	0
Knoxville Iron Co.	38,000	38,000	0	0
Laclede Steel Co.	500,000	500,000	0	0
Latrobe Steel Co.	24,000	24,000	0	0
Le Tourneau Inc., R. G.	83,100	83,100	0	0
Lone Star Steel Co.	550,000	550,000	0	0
Lukens Steel Co.	750,000	750,000	0	0
McLouth Steel Corp.	1,380,000	1,200,000	+180,000	+15.0
Merritt-Chapman & Scott Corp.				
Milton Steel Products Div	90,000	67,000	+23,000	+34.3
Newport Steel Corp.	.....	708,500	D	....
Mesta Machine Co.	141,000	105,000	+36,000	+34.3
Midvale-Heppenstall Co.	163,350	347,100	−183,750	−52.9
Mississippi Steel Corp.	45,000	none	E	....
National Forge & Ordnance Co.	25,000	25,000	0	0
National Steel Corp. (Total)	6,200,000	6,000,000	+200,000	+3.3
Great Lakes Steel Corp.	3,200,000	3,400,000	−200,000	−5.9
Weirton Steel Co.	3,000,000	2,600,000	+400,000	+15.4
National Supply Co.	50,200	50,200	0	0
Newport News Shipbuilding & Dry Dock Co.	12,000	12,000	0	0
Northeastern Steel Corp.	303,200	none	F	....
Northwest Steel Rolling Mills Inc.	48,600	42,000	+6,600	+15.7
Northwestern Steel & Wire Co.	825,000	825,000	0	0
Oregon Steel Mills	120,000	120,000	0	0
Pacific States Steel Corp.	216,000	181,770	+34,230	+18.8
Pittsburgh Steel Co.	1,320,000	1,404,000	−84,000	−6.0
Porter Co. Inc., H. K. (Total)	208,600	67,500	+141,100G	+209.0
Connors Steel Div.	199,000	67,500	+131,500G	+194.8
Vulcan Crucible Steel Div.	9,600	.....	+9,600H	....
Republic Steel Corp.	11,047,000	10,262,000	+785,000	+7.6
Roanoke Electric Steel Corp.	24,000	none	F	....
Rotary Electric Steel Co.	.....	425,000	C	....
Sharon Steel Corp.	1,898,000	1,550,000	+348,000	+22.5
Simonds Saw & Steel Co.	21,600	21,600	0	0
Southern Electric Steel Co.	66,000	none	F	....
Southwest Steel Rolling Mills	45,000	45,000	0	0
Stanley Works	.....	188,280	I	....
Texas Steel Co.	70,450	36,000	+34,450	+95.7
Timken Roller Bearing Co.	700,000	648,000	+52,000	+8.0
Union Electric Steel Corp.	26,760	26,760	0	0
United States Steel Corp. (Total)	39,582,000	38,877,000	+705,000	+1.8
Central Operations	26,620,000	26,305,000	+315,000	+1.2
American Steel & Wire Div.	2,275,000	2,275,000	0	0
Columbia-Geneva Steel Div.	2,679,000	2,490,000	+189,000	+7.6
National Tube Div.	4,011,000	3,810,000	+201,000	+5.3
Tennessee Coal & Iron Div.	3,997,000	3,997,000	0	0
Universal-Cyclops Steel Corp.	70,160	70,160	0	0
Vanadium-Alloys Steel Co.	12,000	12,000	0	0
Colonial Steel Co.	30,000	30,000	0	0
Vulcan Crucible Steel Co.	.....	9,600	H	....
Washburn Wire Co.	93,000	93,000	0	0
West Virginia Steel & Mfg. Co.	.....	72,000	J	....
Wheeling Steel Corp.	2,200,000	2,130,000	+70,000	+3.3
Wickwire Bros. Inc.	30,300	20,800	+9,500	+45.7
Youngstown Sheet & Tube Co.	6,240,000	5,520,000	+720,000	+13.0
Total	133,459,150	125,828,310	+7,630,840	+6.1

A Capacity was owned in 1955 by Merritt-Chapman & Scott Corp.'s Newport Steel Corp.

B Capacity was acquired and abandoned in 1956 by H. K. Porter Co. Inc.

C Capacity in 1955 was owned by Rotary Electric Steel Co. and purchased in 1957 by Jones & Laughlin Steel Corp.

D Capacity is now owned by Acme-Newport Steel Co.

E Entered business in 1956.

F Entered business after Jan. 1, 1955.

G Includes acquisition of West Virginia Steel & Mfg. Co.

H Vulcan Crucible Steel purchased in 1955 by H. K. Porter Co. Inc.

I Capacity purchased by Northeastern Steel Corp.

J Capacity purchased by Connors Steel Div., H. K. Porter Co. Inc.

The Eisenhower Lock in the St. Lawrence Seaway begins to take shape at Massena, N. Y.

Seaway Opens Next July

But full use must await dredging of Montreal channels, scheduled to be finished in 1959. U. S. dredging will be completed next year. Fight over toll rates begins to take shape

THE OFFICIAL opening of the U. S. segment of the St. Lawrence Seaway will come in July, 1958. American contractors, working on $92.6 million worth of projects, report their job is better than 60 per cent completed.

Boom Two Years Away—The U. S. opening will not increase ocean traffic into the Great Lakes next year. Officials of the St. Lawrence Seaway Development Corp. expect the "fourth seacoast" boom to start in 1959. Shifting to the U. S. channel for 14-ft shipping in 1958 will only require the closing of the present Canadian channel. The Canadian channel will be flooded to make the great power pool which is expected to help new industry grow along the St. Lawrence River.

Canada expects to have the Montreal channels dredged to 27 ft when the ice breaks up in 1959. U. S. channels will be ready for 27-ft shipping next year, but must wait for Montreal.

Progress Report — Ports along the lakes are readying their harbors for this traffic (STEEL, Feb. 4, p. 63). Bulk cargo will dominate for many years. By the middle '60s, officials think a shift to general cargo will start. How much comes through will depend upon how fast midwest industries take to the seaway.

Two Opposites—Their basic consideration will be the cost of using it. The long expected fight in Washington is starting to shape up. At opposite poles: 1. Those who would have the seaway completely self-supporting. 2. Those who believe it should be subsidized by the U. S.

The corporation is expected to favor a system of charging both by ship size and cargo. Elimination of either method would discriminate since large ships will have to operate only partly loaded to navigate the 14-ft channels. A combination rate will encourage more shippers.

Battle Lines — Two regional groups are behind the dispute. Midwest users (the Great Lakes-St. Lawrence Seaway Association) claim the Atlantic and Gulf Coast group (the National Committee for a Nonsubsidized Seaway) is just against the seaway.

Neither wants the seaway to be self-supporting or wholly subsidized. They simply want higher

or lower tolls than the corporation plans to call for.

Users, backed by such firms as Ford Motor Co., Chrysler Corp., and Republic Steel Corp., are led by Rep. John Blatnik (D., Minn.) and Sen. Charles Potter (R., Mich.) on Capitol Hill.

Rep. George Fallon (R., Md.), a member of the House Public Works Committee, heads the other camp. It charges that users will try to get Congress to: 1. Turn the seaway over to the Corps of Engineers for maintenance and operation (and eliminate the need for tolls). 2. Or provide an outright subsidy. 3. Or lower tolls so that the seawaay will not be paid off for 100 years.

The Law—It calls for the seaway to be paid off in 50 years. (It has borrowing authority up to $140 million.) The development corporation acts directly under the President and may charge tolls as it sees fit. Complaints can be brought against the corporation's policies at public hearings. Presumably, Congress would step in to change the law any time it felt pressures on the corporation were getting out of hand.

In Washington and Chicago last week, seaway users and competitors compared notes on tolls. Corporation officials may be considering a low tariff at the beginning of the project to take care of "the developmental period," a higher tariff later on. The Association of American Railroads opposes that move. It wants the seaway paid for in 50 years and at a constant rate. Users believe such rates would keep traffic away.

Costs—Lewis G. Castle, seaway corporation head, estimates annual maintenance and operation costs of the U. S. seaway at $2 million: "There is a fair possibility that this estimate can be reduced." He expects the seaway to meet that obligation from the beginning although it may operate at a "book deficit" (interest rates on the corporation's borrowings) during an "initial development period."

Findings — E. Reece Harrill, chairman, seaway tolls committee of the corporation, told users about a survey of shipowners and operators, ports, railroads, and interested government agencies. A majority favor a minor charge on a vessel's registered tonnage with the principal charge being levied against the cargo.

Another problem: How much should be charged for partial use of the seaway? The answer may be in mileage or number of locks passed through.

The only specific recommendation for tolls so far has come from the AAR: 50 cents a ton on bulk commodities; $1.25 a ton on general cargo.

Outlook—Seaway officials do not look for any delay because of the toll question. They think it will help publicize the seaway and alert all interested parties to the need for reaching a sensible conclusion. Their argument: The seaway will eventually benefit all.

New Plant and Equipment Expenditures

(Millions of dollars)

	Year		Fourth Quarter	
	1957*	1956	1957*	1956
Manufacturing	16,191	14,954	4,089	4,428
Durable goods	8,218	7,623	2,096	2,339
Primary iron, steel	1,684	1,268	468	447
Primary nonferrous	875	412	259	152
Electrical machinery & equipment	653	603	191	199
Machinery, except electrical	1,257	1,078	332	330
Motor vehicles & equipment	1,194	1,689	247	453
Transportation equipment, excluding motor vehicles	596	440	152	140
Stone, clay & glass	604	686	158	201
Other durable goods	1,355	1,447	289	417
Nondurable goods	7,973	7,331	1,993	2,089
Mining	1,242	1,241	290	346
Railroads	1,457	1,231	344	332
Transportation, other than rail	1,751	1,712	454	450
Public utilities	6,254	4,895	1,716	1,452
Communication, commercial & others	10,135	11,048	2,308	2,830
Totals	37,030	35,081	9,201	9,838

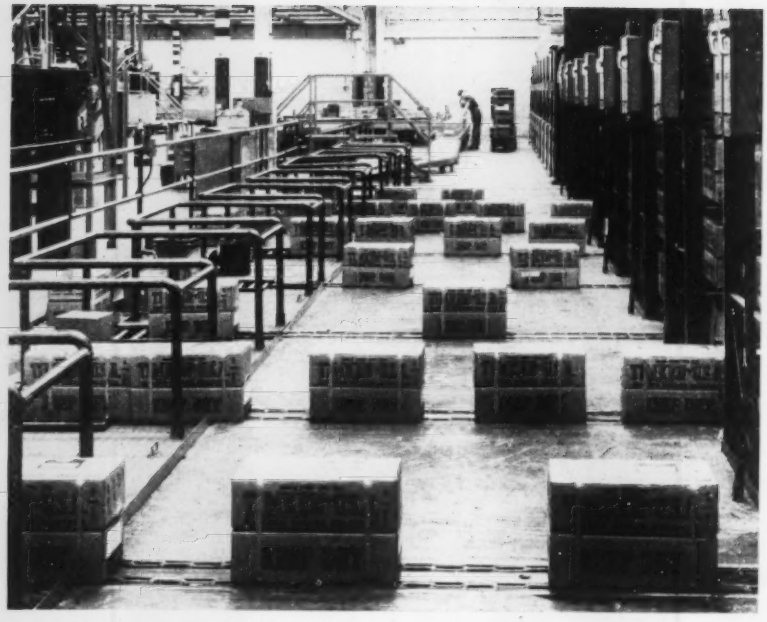
*Estimated.
Source: Department of Commerce, Securities & Exchange Commission.

Is Spending Leveling Off?

● Capital spending will set a record in 1957, indicates a survey by the Commerce Department and Securities & Exchange Commission.

This year's $37 billion will be 6 per cent better than last year's total. Economists wonder if a temporary peak hasn't been reached. They point to declining rates of spending during 1957. The third quarter saw a peak annual spending rate of $37.23 billion (seasonally adjusted); the fourth quarter will fall off to $37.17 billion (seasonally adjusted).

Public utilities will record the best gain this year: Up 28 per cent from last year. Railroads will spend 18 per cent more; manufacturing industries, 8 per cent more.



Chain floor conveyers move 10 million pieces a month

Timken Integrates Plant

THE WRAPS are off Timken Roller Bearing Co.'s bearing plant at Bucyrus, Ohio.

Exact scheduling of production is the eye-catcher: The automatic facility is integrated with a shipping center controlled by IBM computers.

From the time a load of tubes is placed on the screw machine stock rack until the finished and wrapped product is placed in the shipping box, all operations (including final gaging) are automatic.

Efficient operation is assured by the IBM 650 at the Canton, Ohio, office. The computer calculates the inventory status of an item in less than 2 seconds.

Production — The 180,000 sq-ft plant can turn out 33 million cups and 27 million cones annually. Parts are made on 11 production lines, using equipment designed for Timken. Single-purpose screw machines and grinding equipment conserve space. Machines equipped with carbide tooling can produce eight times as many cups per hour as their predecessors.

Built-in quality control keeps an accurate check on the parts and machines throughout production.

Use of Computer — The major task of the IBM 650 is to keep track of inventory, scheduled production, and unshipped customer orders. With that information, Timken can quickly determine whether a customer's shipping date request can be met.

Shipping Center—IBM cards are sent to the center at Bucyrus, along with bearings and parts from the other plants. The building has six receiving docks, 12 truck loading docks, and two railroad loading docks.

Incoming boxes are placed on a conveyer and moved to an unloader which also stacks the empty pallets. The boxes pass the IBM key punch operator.

The item number and quantity in each box are punched on the card, which is slipped into the end of the box. Boxes move to the main aisle and are placed in storage. Every vacant space in the storage area has an IBM location card.

Picking the product is essentially the reverse of the storage method.

As a result of the careful scheduling, orders are completed at a predetermined time regardless of how many different sizes are involved. Trucks arrive at the dock at a set time, and the entire order can be loaded immediately.

Ideas on Display

Show at Cleveland points up why industry spends $6 billion annually on instrumentation

SYSTEMS engineering brought 30,000 people to Cleveland last week.

At the twelfth annual Instrument Conference, sponsored by the Instrument Society of America, they heard seminars discuss instrumentation for systems control, and they crowded the exhibit halls.

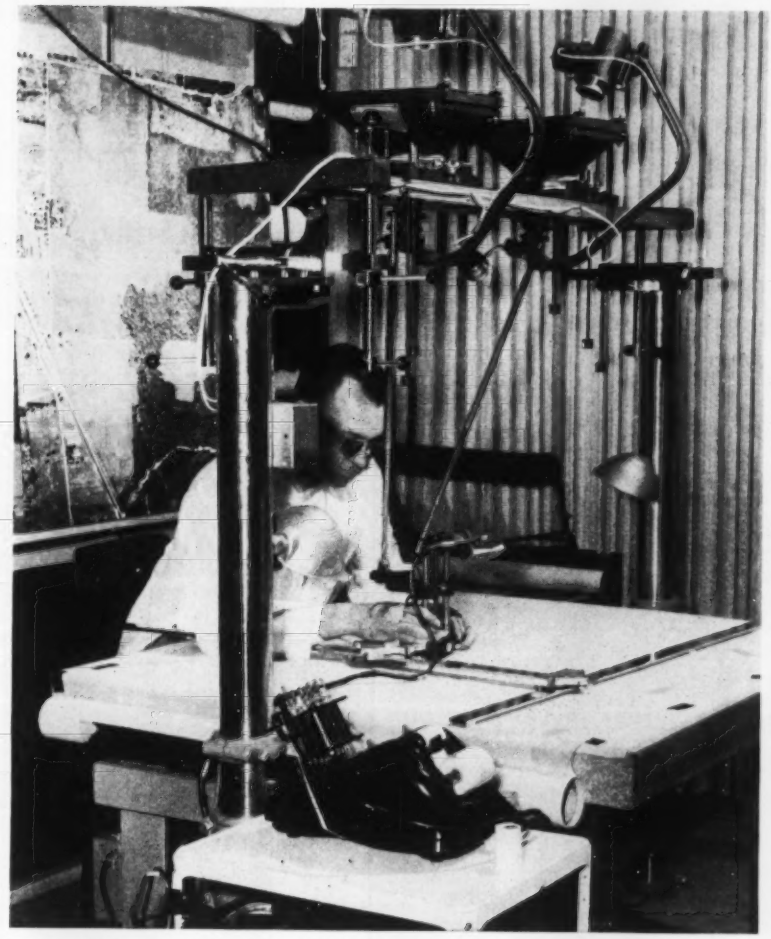
Growth — Speaking before the opening seminar, Dr. Simon Ramo, executive vice president of Ramo-Wooldridge Corp., Los Angeles, outlined the reasons system engineering has become so important:

"The job of integrating a large number of men and instruments, as distinct from the invention and design of individual items of instrumentation; the over-all answer to the problem of the complete operation; the breaking down of the problem into harmonious, consistent parts."

Hardware — The systems engineer has a fantastic job if the variety of components displayed in the exhibits was any indication. Suppliers of formed parts, wire, alloys, tubing, and thin strip found inquiries running to extreme tolerances, improbable physicals, and imaginative combinations.

Some impressions from the exhibit halls: The vacuum tube is a back number . . . this is the stronghold of small business . . . miniaturization is all important . . . ideas grow like weeds here.

Some of the ideas displayed: A remotely operated pipe coupling; a nonparallax instrument dial; an automatic wear indicator; a low cost, pressure sensitive element made of tube-in-strip; an electronic guard for machinery, which uses a radio-frequency field.



James H. Angel, chief engineer of Kucera & Associates Inc., uses a modified Kelsh Plotter to compute the volume of a stockpile photographed from the air. Spot elevations are relayed electronically to the adding machine

Aerial Photos: Inventory Aid

TAKING inventory of coal, iron ore, limestone, and other bulk materials is easier today than ever before, thanks to aerial photography. The method developed by Robert H. Kucera, Cleveland pilot and geologist, is said to be faster, more accurate, and often less costly than the ground survey system.

Instead of computing the volume of an ore pile by driving stakes and taking transit readings, Mr. Kucera photographs it from 1500 ft and makes his calculations in a laboratory.

So precise is his method that he can detect a variation of 1.2 in. in stockpile elevation. An inventory of bundled scrap, considered nearly impossible to appraise by any method, proved to be accurate within 1 per cent, convincing a major steel producer that he should use the system for scrap as well as other inventories.

Advantages—1. Aerial surveys reduce the margin of error from 8 per cent, which is not unusual for ground surveys, to 1 per cent. 2. They permit computation of inventory at a specific moment, eliminating worries about stockpile additions or withdrawals. 3. They require less time than ground surveys and often cost less. (Some inventories can be completed within 48 hours. The cost of surveying a Pittsburgh area iron ore pile, 2000 ft long by 250 ft wide, would be about $1200.) 4. Since a survey is made by a disinterested party, it's less likely that figures will be juggled to agree with inventory records. Price Waterhouse & Co., the accounting firm, is particularly enthusiastic about this feature.

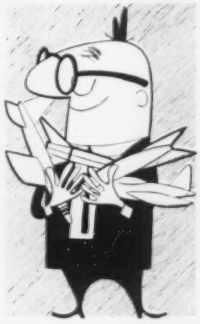
Founded in 1947, Kucera & Associates Inc. began stockpile inventory work in 1950. Its first client was American Steel & Wire Div. of U. S. Steel Corp., Cleveland. Other firms for which it now makes regular surveys include Jones & Laughlin Steel Corp., Pittsburgh; Youngstown Sheet & Tube Co., Youngstown, and International Minerals & Chemical Corp., Chicago.

Other Applications—The technique has been successfully applied to strip mining and estimating the amount of earth to be moved in excavating or leveling. Especially important to those prospecting for minerals is the fact that airborne surveyors don't excite speculation as land survey teams would.

How It's Done—After he takes a series of photographs, Mr. Kucera returns to his laboratory, where he makes glass positives from the photo images. They are inserted in a Kelsh Plotter and projected to a small white screen, where they're viewed in three dimensional clarity. The screen is raised or lowered until a pinpoint of light at its center appears to be resting on the surface of the stockpile. The spot elevation is read from a gage which is synchronized with the screen's vertical adjustment and calibrated with known elevations around the stockpile.

By applying a 10-ft grid to the stockpile and checking the elevation at the center of each square, it's possible to determine the average height for every 100 sq ft of the stockpile surface. Totaling the elevation figures electronically (a method originated by Mr. Kucera) and dividing by the number of readings gives the average elevation of the pile. Average elevation times square foot area gives cubic volume.

Small Business Outlook: Primes Keep Contracts



ASKED about chances of increased defense business for small firms in 1958, a top small business-Defense Department liaison man comments: "We are worried." Says a staff member of the Senate Small Business Committee: "We are unhappy."

Defense reports small businesses reaped about 20 per cent of military prime contracts in fiscal 1957. It means there was no gain in number of contracts from the 1956 figure, although dollar value increased 9 per cent.

So Small Firms Will Get More Data

In an era of steady, rather than rising, defense work, the government can help by making more drawings and engineering data available to small business. The Senate Small Business Committee reports 567 items of military procurement (from fuel pump repair kits to motor-generators) are bought by Defense from a single source. None of these items, says the committee, was made by small firms because there were no specifications available from Defense for potential bidders.

Urged by the committee, Defense's assistant secretary for supply & logistics, Perkins McGuire, has established a special office to provide more data to suppliers. Ray Harris, a specifications specialist, is in charge. If Mr. Harris is lucky, guess some Pentagon observers, he will be barely able to keep small business' share of defense work from declining next year. There is little chance for an increase.

Advice to small firms losing out to primes that are holding work they once subcontracted: Get the word into Washington. There is a good chance for curative legislation next year. The Senate committee, since July 1, has received almost 50 complaints from small firms which have lost out to primes.

Pressure Isn't Needed: Just Competition

Sen. John Sparkman (D., Ala.), head of the committee, thinks about 25 per cent of defense procurement should go to small outfits. His basic contention: You don't have to legislate a percentage; just give small firms the opportunity to compete.

A staff member admits it's good business for prime contractors to hold as much work for themselves as they can, but when it's done at a cost to the taxpayers, there is no excuse. Incidentally, the committee is also looking into methods used by primes in reporting their subcontracting to Defense Department and the way Defense reports its small business figures.

Roadblock to Small Business Help?

The Federal Reserve Board may be trying to wiggle out of a decision on whether small business needs aid from Congress in raising capital. FRB says it will study the situation and make a report early in 1959.

That would effectively block attempts of Capitol Hill friends of small business to get the FRB on their side in next year's legislative battle over small business taxes. Chances are that real help for small companies (better depreciation rates, an enlarged SBA program, lower estate taxes) won't get through until the FRB has its say.

Capitol Notes

Power needed to operate the nation's public water utilities will be 28 million kw-hr by 1975, compared with 15 million kw-hr in 1953 . . . The Navy will launch its fifth nuclear submarine next month . . . Know-it-alls are betting that there will be more Jupiter than Thor in the missile to be born of Secretary Wilson's October decision.

U. S. Buyers Are Watched

"No government purchasing agent should be able to say that he did not know someone else in the government had excess property while he is purchasing the same property," warns Sen. Lyndon Johnson's (D., Tex.) Preparedness Investigating Subcommittee.

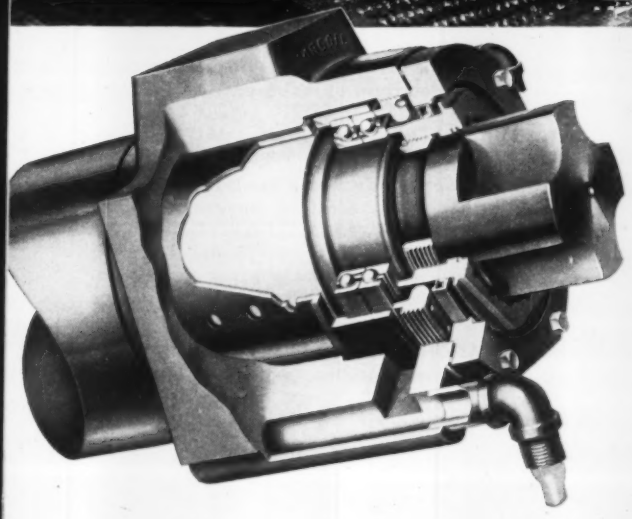
The subcommittee recommends: 1. Some method of enforcing present regulations for disposal of surplus property. 2. Creation of a system for crosschecking surpluses among the armed services as well as within them. Consensus: Despite much talk in recent years about saving the taxpayer's dollar, we are still buying with one hand what we sell with another.

Outlook: Next year, Congress will move into the Defense Department in full force to try to hold the economy line established by the $38 billion defense spending ceiling. Senator Johnson's subcommittee and Rep. F. Edward Hebert's (D., La.) look at aircraft engine makers' profits this year portend some investigations next year.

Housing Formation Rolls Along

The Housing & Home Finance Agency has happily announced the formation of the 50 millionth U. S. household. All metalworking industries can take heart from the trend figures from the Census Bureau: In 1954, there were 46.9 million households; in 1955, 47.8 million, in 1956, 48.1 million. If that trend continues, there will be another 5 million households in six years.

Morgoil Bearings in Action



The 18″-72 MORGOILS on the 9″ and 21″ x 44″ Aluminum Foil Mill at Cochran Foil Co. pictured above make it easier to produce a quality product at high speed. Foil as thin as .00025 of an inch is rolled at speeds approaching 4000 feet per minute on MORGOIL-equipped mills. MORGOIL BEARINGS give you freedom from wear and fatigue and permit operation at high speeds with remarkable long bearing life.

MORGAN CONSTRUCTION CO.

WORCESTER, MASSACHUSETTS

ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS
WIRE MILLS EJECTORS REGENERATIVE FURNACE CONTROL

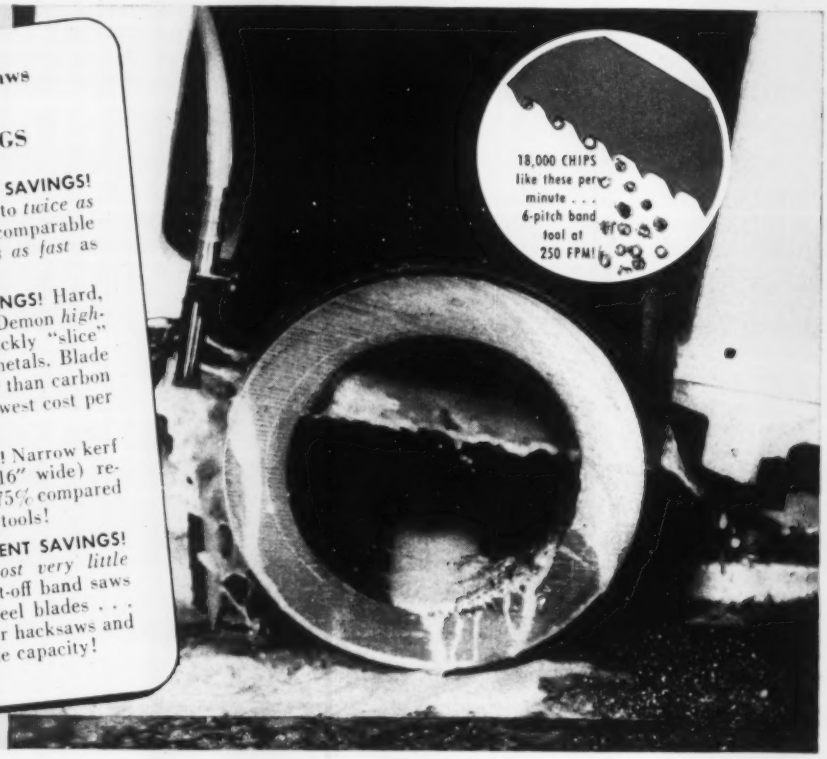
MB-31

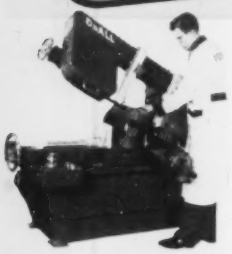
MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER

DoALL'S NEWEST SAWING METHOD
reduces cut-off costs in every shop!

Only DoALL Power Saws give you these 4 Big Cut-Off SAVINGS

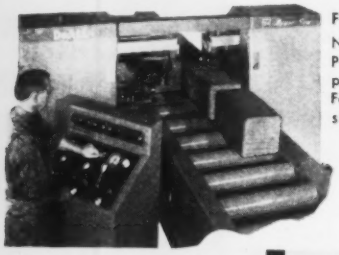
1. **NEW TIME AND LABOR SAVINGS!** DoALL Power Saws cut up to *twice as fast* as power hacksaws of comparable capacity . . . up to *6 times as fast* as other band saws!
2. **NEW CUTTING TOOL SAVINGS!** Hard, ultra-sharp, longer-lasting Demon *high-speed steel* saw teeth quickly "slice" through any machinable metals. Blade lasts up to 30 times longer than carbon steel blades—gives you lowest cost per cut!
3. **NEW MATERIAL SAVINGS!** Narrow kerf of the Demon blade (1/16" wide) reduces chip waste 50% to 75% compared to other saws or parting tools!
4. **NEW CAPITAL INVESTMENT SAVINGS!** DoALL Power Saws *cost very little more* than light duty cut-off band saws that use only carbon steel blades . . . and *cost less* than power hacksaws and cold saws of comparable capacity!





FOR HIGH PRODUCTION CUT-OFF SAWING!
NEW Automatic Model C-58 Power Saw. Automatic stock indexing model with 12" x 12" capacity.

FOR EVERY CUT-OFF JOB!
NEW Low-Cost Model C-12 Power Saw. Manual feed model with 12" x 12" capacity. Features HSS saw bands.



FOR BIG CUT-OFF JOBS!
NEW 24" x 24" Capacity Power Saw. Automatic push-button operation. For rounds, bars, pipe, structurals, etc.

Find Your DoALL Store In The 'Yellow Pages'

NEW "Integrated" Design of Blade and Machine Offers NEW Accuracy . . . NEW Savings!

This NEW "integrated" combination of a new type, powerful DoALL band machine—and new Demon *high-speed steel* blade—now makes many present cut-off methods *obsolete!* Why? Because the blade and machine work together to outperform virtually any other cut-off machine of comparable capacity—giving you the lowest cost per cut! Compare these sawing features with your present cut-off method: FASTER CUTTING . . . LONGER TOOL LIFE . . . GREATER ACCURACY . . . BIG MATERIAL SAVINGS . . . AUTOMATIC OPERATION . . . LOW MACHINE INVESTMENT!

The New Demon *high-speed steel* saw bands cut all machinable metals . . . they withstand cutting temperatures up to 1100° without losing tooth hardness . . . and they last up to 30 times longer than carbon steel saw bands! There's a DoALL Power Saw to meet your range of cut-off jobs. Investigate how one of these new band machines can reduce costs and modernize *your* cut-off operations.

FREE DEMONSTRATION—Call DoALL locally today for a free "in-your-plant" demonstration—using your own materials. Or, send for the FREE "Power Sawing Handbook" which describes these modern cut-off machines.

THE DoALL COMPANY, Des Plaines, Illinois

PS-8

THIS IS A TYPICAL DoALL STORE

Call Your DoALL Service-Store

MACHINE TOOLS ..... CUTTING TOOLS ..... MEASURING INSTRUMENTS ..... SHOP SUPPLIES IN STOCK

McKinney Mfg. Co.

Builders' Hardware Shipments

(In thousands of dollars)

*1957	$370,125
1956	371,500
1955	355,866
1954	323,511
1953	270,925
1952	250,390
1951	279,270
1947	193,925

*Estimated by STEEL.

Builders' Hardware Sales Big

Slowdown in shipments for housing has been offset by gains in commercial, institutional, and public installations. Prices are up, but competition is aggressive

BUILDERS' HARDWARE manufacturers expect to exceed $370 million in sales for the second year in a row. Several larger producers of locks, locksets, and the 28 other products in this category will have a record sales year.

Leo J. Pantas, vice president and general manager, Yale Lock & Hardware Div. of Yale & Towne Mfg. Co., White Plains, N. Y., says: "Yale lock and hardware volume appears to be headed for the biggest year in the company's 89-year history. Shipments are substantially higher than those for the same period last year, and if this pace continues, an all-time sales record will be established."

The table above shows that shipments have nearly doubled in the last ten years. Sales for commercial, institutional, and public installations are up 10 to 15 per cent this year.

Problems—Despite high over-all sales, some shadows dim the outlook. Housing shipments are down 20 to 25 per cent. Mergers and low margins have reduced the number of producers to around 170, a loss of 5 per cent.

An average 5 per cent price increase is being maintained with difficulty because of sharp competition at all price levels.

Other facets of the situation are stated by J. E. Fox Jr., merchandising manager, Sargent & Co., New Haven, Conn.:

"Builders are demanding higher grade hardware, notably for housing and commercial construction where unit dollar volume of sales is higher. Cheaper lines are losing ground, and demand for stainless steel products is heavier."

Expanding Lines—Sargent has broadened its line of locks and hardware. Higher prices and better sales of quality products are more than offsetting the 20 per cent decline in housing demand.

The company has designed locks with adhesive vinyl inserts that permit the home owner to change color combinations when redecorating.

Aluminum, dull bronze, polished brass, and dull chrome give 24 color combinations in the higher priced line. Rectangular and square escutcheons (including a large size with a personalized monogram) are separate accessories used in the lower priced residential locks.

Yale & Towne has also been expanding. At midyear, a Salem, Va., unit started shipments of hardware used as components in the manufacture of metal and wood windows. A fifth plant, at Monroe, N. C., will be completed by the end of this year.

American Hardware Corp., New Britain, Conn., increased sales 6.9 per cent in the first half. Incoming orders increased 8.5 per cent, and the unfilled order backlog increased 9.7 per cent.

Consolidating—The firm has acquired Kwikset Locks Inc., Anaheim, Calif. The move brings it into the low-cost residential lockset market. Up to this time its primary distribution has been in hardware for office buildings, hotels, schools, hospitals, commercial construction, and higher priced residences.

Two of the largest government contracts for hardware installations (the new Atomic Energy and State Department buildings) were awarded to American Hardware.

Price Squeeze—The larger, more

diversified manufacturers are getting a bigger share of the market than smaller producers.

Manufacturers and distributors caught in the price squeeze on lower priced housing lines are generally improving quality, both in materials and assembly control.

Contract distributors, selling larger installations to architects' plans and specifications, account for over one-third of total sales. This group of 500 is 10 to 15 per cent ahead of 1956 volume.

Approximately 90 per cent of all production is sold through distributors, wholesalers, hardware dealers, and lumberyards.

In commercial and institutional construction, builders' hardware represents 2 per cent of the total material costs, while in housing the ratio is only 0.5 per cent.

Top Sellers — Locks, locksets, and lock-trim sales account for one-fourth of builders' hardware volume, about $93 million. Sales of sliding overhead door hardware are up sharply, climbing from $16 million to $62 million in ten years.

Builders' hardware accounts for about 35 per cent of hardware sales, which will be in excess of $1.1 billion this year.

AEC Invites Reactor Bids

The Atomic Energy Commission will accept proposals for the engineering design of a natural uranium, gas cooled, graphite moderated nuclear electric power plant of 40,000 kw capacity until Sept. 23, 1957.

Qualified firms that have not received a specific invitation to submit such a proposal should address the Division of Reactor Development, U. S. Atomic Energy Commission, Washington 25, D. C.

Steel Wages Near $3

An increase of 12.1 cents an hour over the June average hiked the steel industry's wage rate to a record $2.983 in July. The figures do not include an average cost of 29 cents per hour for pensions, social security, and insurance.

The American Iron & Steel Institute states that the gain reflects wage increases granted by three-year labor contracts.

A white hot billet is pierced—the first step toward becoming a high-pressure container—at National Tube's Christy Park Works

Makes Gas Container

U. S. STEEL CORP.'S National Tube Div. is making seamless cylindrical steel containers to hold gases and chemicals at pressures up to 10,000 psi.

The corrosion - resistant cans, with wall thicknesses up to 3 in., are forged from white hot billets, or produced from seamless pipe or cupped plates. They are then drawn and machined. The ends of the cylinders are hot formed by spinning, swaging, or forging.

Size—Length varies from 3 to 80 ft. They range up to 30 in. in diameter.

Some are normalized and pass through a hydrostatic testing process. Interior cleanliness is essential.

Uses—The cylinders are made at the Christy Park Works, McKeesport, Pa. They hold hydrogen, helium, and nitrogen to back up missile propellents. Other uses include hydraulic containers and welding tanks which hold helium and argon.

Cyclone Makes Fiberglas

Fiberglas screening is being made by the Cyclone Fence Dept. of U. S. Steel's American Steel & Wire Div. at Greensburg, Ind.

Vinyl-coated Fiberglas, with a

tensile strength of 250,000 psi, is woven into screening by a continuous process. The strands are fused at over 300° F.

Advantages of the screening include lightness, heat and corrosion resistance, and visibility.

Nuclear Lab About Ready

Minnesota Mining & Mfg. Co. will complete construction of a small nuclear research center near St. Paul next month. It will include a nuclear materials laboratory for development of high temperature reactor materials and a gamma radiation facility.

American Lava Co., a Minnesota Mining subsidiary, will build a pilot plant in Chattanooga, Tenn., for production of ceramic fuel elements. The plant should be ready next spring, said R. A. McGinnis, vice president. Covering about 7000 sq ft, it will employ 20 initially.

More Power for Aluminum

An underground powerhouse, capable of generating about 745,000 kilowatts, is being built by Aluminium Ltd. at Chute des Passes, Que., on the Peribonka River.

Five 200,000-hp generators will be installed at the end of a 6-mile tunnel. When completed (August, 1959), the facility will give Aluminium Ltd. about 3.57 million kilowatts in Canada. Cost: Over $125 million.

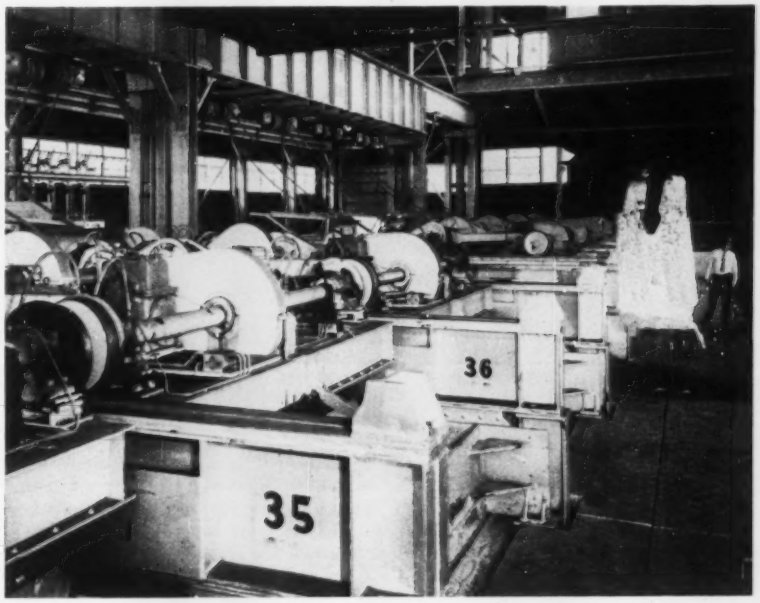
YS&T To Open Tube Mill

Youngstown Sheet & Tube Co"s new seamless tube mill at East Chicago, Ind., will begin operations about Oct. 1.

The new facility, which eventually will employ at least 300 workers, is the first seamless installation at the company's Indiana Harbor Works. Currently the firm makes all its seamless pipe at Youngstown.

Seamless tubing is used by Youngstown's customers primarily for oil well casing. The new mill will make tubes ranging from 4½ to 9⅝ inches in outside diameter.

A feature of the mill is a giant rotary furnace capable of handling as many as 200 billets at one time, raising their temperature to 2200° F.



An 8-ton ingot is lifted from one of Allegheny Ludlum's soaking pits

A.L. Balances Facilities

EIGHT FURNACES have substantially increased the soaking pit capacity of Allegheny Ludlum Steel Corp.'s Brackenridge, Pa., works. The gas fired furnaces are housed in a new, 10,000 sq ft building.

The installation is a major unit in a multimillion dollar program to bring the firm's stainless and electrical steel finishing facilities into balance with its steel melting capacity.

Electrically operated doors roll back to allow a crane to place ingots in the pits.

Removal of scale and ash from the heating chambers is facilitated by a bin arrangement underneath the pits.

Market for Self-Unloaders

A Bradley Transportation Co. freighter, the *M. C. Taylor,* is taking on three types of iron ore at Two Harbors, Minn., which it will try to self-unload at a lower lake port. If the experiment is successful, self-unloaders will be used to haul iron ore, coal, and stone.

Ore shipments to lower lake ports totaled 58,269,067 tons up to Labor Day. That is 16 million tons more than were hauled in the same period of 1956.

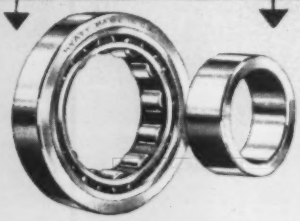
Few Strikes in July

Strike · idleness in the first seven months of this year was lower than it has been in any comparable period since 1945. In July it was the lowest for the month since 1951, reports the U. S. Department of Labor's Bureau of Labor Statistics.

The 625 strikes in July (including those continuing from earlier months) directly involved 260,000 workers for 2.5 million mandays, compared with the 600 strikes in effect in June that idled 220,000 workers for 1,850,000 mandays.

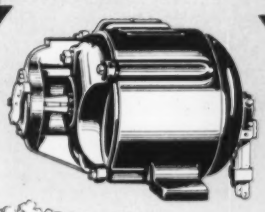
Only one of the stoppages that began during July involved as many as 10,000 workers. The dispute, involving machinists and the California Metal Trades Association, continued into August.

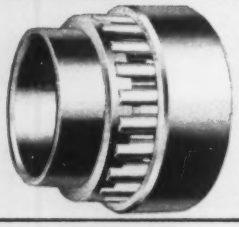
There's a HYATT HY-ROLL for every load...



HY-LOAD Series

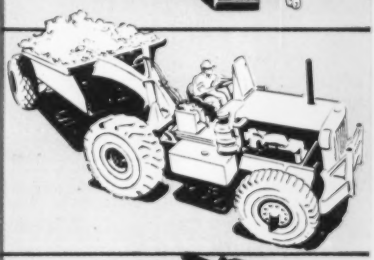
Designed for a wide variety of radial loads, and light or intermittent thrust loads, these high-capacity bearings are made in four diameter series and fourteen major types.

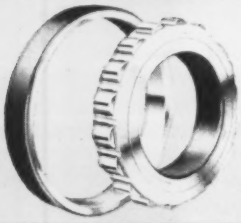




INDUSTRIAL INCH Series

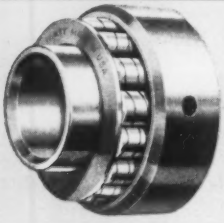
For heavily-loaded, slow-moving machinery, the Industrial Inch Series was designed to accommodate large diameter shafting where fractional dimensions are required.





AIRCRAFT Series

Available in over 100 sizes, the Aircraft Series attains the optimum in life-load combinations for ultra high-speed, high-temperature applications and maximum dependability.



WOUND ROLLER Series

Specifically developed for maximum resistance to shock, abrasion and fatigue, these three-part, separable bearings can be used without the inner race when desirable.

If you would like the technical assistance of an experienced sales engineer, phone or write Hyatt Bearings Division, General Motors Corporation, Harrison, N.J.; Pittsburgh; Chicago; Detroit; Oakland, California.

FOR REPLACEMENT BEARINGS, SEE YOUR HYATT INDUSTRIAL BEARINGS DISTRIBUTOR

GM GENERAL MOTORS

HYATT HY-ROLL BEARINGS

FOR MODERN INDUSTRY

New Job for Jim Nance:

. . . keep Mercury's sales up

. . . sell Lincoln's unit body

Nance Heads L-M Division

FORD MOTOR CO. has appointed James J. Nance, former vice president of marketing, to head its reunited Lincoln-Mercury Div.

The move came sooner than had been anticipated, but rumor had it for some time that the two divisions might be put back together again. Motordom is asking: What's the reason for the switch?

History — Lincoln and Mercury were joined as a single division in 1945 when Ford started its reorganization drive. In April of 1955 they were separated in an effort to capitalize on the booming medium priced car market.

At that time, Ben D. Mills, company vice president, was named manager of the Lincoln Div. F. C. Reith was appointed as Mercury's general manager. Mr. Mills will continue as a vice president and will be assistant general manager under Mr. Nance. Mr. Reith will be given another executive position in the company.

Reasons—Looking ahead, industry observers feel the move means Ford will give Lincoln and Mercury the hard sell.

Mr. Nance already has pulled in Joseph Bayne from the company's dealer policy board and made him general sales manager of the new division. More sales shifts are expected. Mercury, of necessity, will be upgraded now that it's tied more closely to the Lincoln line.

Space—This makes more room for Edsel. Motordom already has felt the Edsel would compete too closely with Mercury under the old setup. The move is especially important because the medium priced market has stopped growing, and Ford doesn't want to overload this segment of the market.

Help Needed—Mercury needs to be pushed in '58. The car has been changed little. It will have to be merchandised to make money.

Lincoln also needs a lot of attention to make sure the public will buy the concept of unitized construction which Lincoln will introduce in 1958.

Sales of Ford's luxury car have slipped slightly, while those of Chrysler's Imperial have quintupled. The company can't let Lincoln drop to a poor fourth in the luxury car race.

Best Man—This sort of situation

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is made to order for Mr. Nance. He's long been hailed as a merchandising expert. Now he'll have a chance to prove it as far as the auto industry is concerned.

Mr. Nance made his marketing reputation during the 1930s in the appliance business, one of the reasons he was brought in as head of Packard Motor Car Co. in 1952. Unfortunately, he never had a chance to prove whether he could peddle cars.

By the time he had solved the other troubles Packard (later Studebaker-Packard Corp.) faced, there was no money or time left to try his merchandising techniques. (See STEEL, Apr. 30, 1956, p. 73.)

Now he'll have that chance. It could lead to a higher niche in the Ford hierarchy.

Outlook: If Mr. Nance is successful, you can expect results like these:

- Mercury will compete more directly against high priced Buicks and lower priced Chrysler Div. cars. Its super Park Lane series (for '58) should help.
- If the public goes for Lincoln's unitized construction, Mercury may be next to scrap the body and frame concept. It's highly doubtful that the costs of unit body building can be made to pay on the low volume Lincoln has.
- Plenty of changes in the Ford manufacturing setup would result. One possible solution: Edsel could take over Mercury assembly plants. Mercury would get its own assembly layout, or share the present Lincoln plant which has room for expansion.

Labor Faces Fight

It looks like the auto companies plan to fight back against the union this year as contract negotiations draw closer.

Their feeling seems to be that since labor already is in some disrepute because of Messrs. Beck and Hoffa, now is the time to push hard for public approval which would give them a bargaining edge.

The fight already has shown up in the car company replies to Mr. Reuther's proposals to cut car prices $100 and in his efforts to hold precontract discussions on the short work week.

Usually, the Big Three don't engage in advance skirmishes.

The big questions: Will the fight lead to a strike? If it does, will the industry hold out?

Mr. Reuther won't pull a strike if he feels it will turn public approval farther away from him. That's the kind of attitude the car companies hope to foster in the next few months.

It's still too early to tell which way the fight will go, but it's obvious the industry is showing more spirit than it has for years.

Key to Sales: Labor?

Labor contracts favorable to the auto companies could insure a successful sales year in 1958.

Car builders already have indicated such as increase is expected (6.5 million unit sales), but they don't sound as confident as they have in recent years.

Part of this is because they've guessed wrong before. Part of it is the threat of inflation which is making them cautious.

Vauxhall Prices Set

The Pontiac Div. of General Motors Corp. has announced the Vauxhall Victor Super will carry list prices of $1812 (New York), $1881 (Detroit), and $1994 (San Francisco).

U.S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
July	495,629	448,876
August	524,854	402,575
8 Mo. Total	4,393,371	4,044,052
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Aug. 10	118,864	108,167
Aug. 17	117,598	98,348
Aug. 24	123,130	69,676
Aug. 31	118,563	58,166
Sept. 7	89,383†	47,827
Sept. 14	74,350*	64,350

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

The car will go on sale at Pontiac dealers this month, reports S. E. Knudsen, Pontiac's general manager.

The Victor is made for GM in England. Another GM overseas product, the Opel, will be introduced soon by Buick.

The $1800 list price tag on the Victor is $1000 more than the delivered price for a Volkswagen. It comes close to the list price of the Chevrolet and low priced Ford.

Ford Scraps Monarch

Ford's Edsel will replace the Monarch, which the company sells only in Canada. Rhys M. Sale, president of Ford Motor Co. of Canada Ltd., says the Monarch will be discontinued at the end of the current model run (this month).

It was similar to the Mercury and contained most of the same parts, although the Mercury also is marketed in Canada. Mr. Sale also indicated he expects Mercury-Lincoln sales will be boosted by the addition of the top Mercury series, the Park Lane.

1957 Model Runs End

The 1957 model runs are over, and most of the tallies are coming in. Buick and Packard suffered the greatest drop in output, compared with 1956 performances. The GM division built 297,733 cars this year, compared with 410,865 last year. Packard dropped from 12,875 to 4654 this year. The greatest increase was Chrysler's Imperial: 30,166 units this year, versus 6548 in 1956.

As the 1958 model run opens, Edsel has assembled 29,354 cars (by Sept. 8).

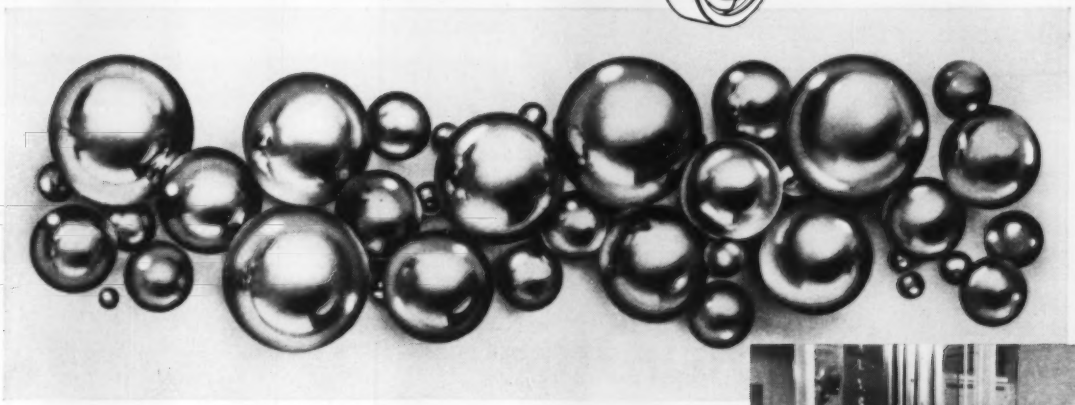
Exhaust Notes

- Willys Overland Export Corp., distributors in Europe, Africa, and the Middle East, will hold its annual business meeting in Paris, Oct. 3-13. The company will introduce the Forward Control Jeep FC 170 at this meeting.
- American Motors Corp. has invited 12 of the nation's top economists to advise it on the economic aspects of 1958 collective bargaining. The meeting is tentatively scheduled for late September.

FACTS

about

NEW DEPARTURE STEEL BALLS



Talyrond gaging graphs of ball sphericity and surface finish give readings to within three one-millionths of an inch, assuring product superiority that meets your most rigid specifications.

Why Leading Manufacturers Choose New Departure Steel Balls

Prompt delivery . . . quality . . . and quantity . . . to fit your specifications! These are the major reasons why leading manufacturers choose New Departure to fill their steel ball needs.

To assure that every steel ball ordered meets your most rigid specifications, New Departure performs its own metallurgical laboratory inspections, its own annealing and wire drawing operations.

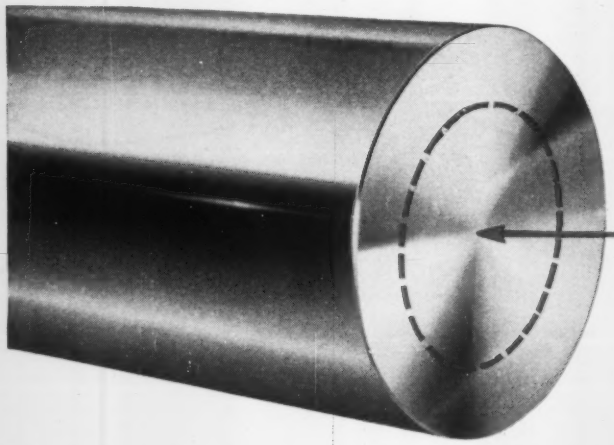
And . . . to process all orders readily, New Departure ball manufacturing facilities are maintained completely independent of all other production. This means that high-carbon chrome and stainless steel balls are quickly available in a complete range of sizes and specifications in quantities.

In addition, New Departure produces balls of special materials such as high nickel-cobalt base alloys, tool steel, plastics, nylons and vacuum-melted materials. For immediate attention to your ball needs, write or call New Departure, Division of General Motors, Bristol, Connecticut.

Send for Catalog SBC

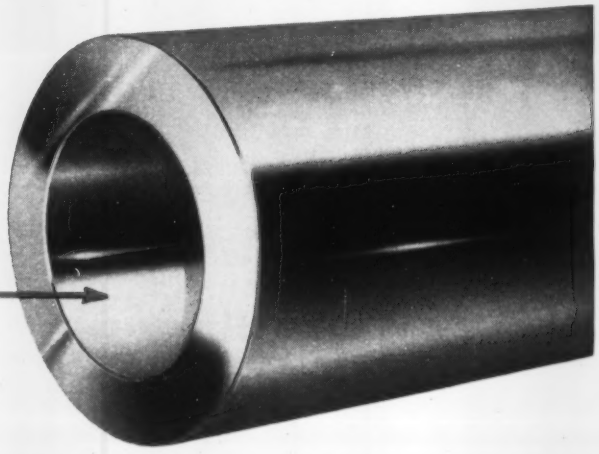
BALL BEARINGS MAKE GOOD PRODUCTS BETTER

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.



Why bore this out . . .

when you can get the hole ready-made?



Save money on hollow parts by switching from bar stock to TIMKEN® seamless steel tubing

Check these savings you get when you make hollow parts with Timken® seamless steel tubing instead of bar stock:

1. **NO HOLE TO DRILL**—it's already there.
2. **ELIMINATION OF COSTLY BORING OPERATION** frees part of your screw machines for other jobs—adds machining capacity *without* adding machines.
3. **MORE PARTS PER TON OF STEEL** because there's less metal to hog out.

And with Timken seamless steel tubing you get better quality finished products. The piercing operation by which Timken seamless steel tubing is made gives the tubing its fine forged quality. A solid round is forged over a mandrel, thoroughly working the metal inside and out. Accurate temperature and piercing speed control combine to produce uniform, fine forged quality. And we maintain this quality from tube to tube, heat to heat, order to order.

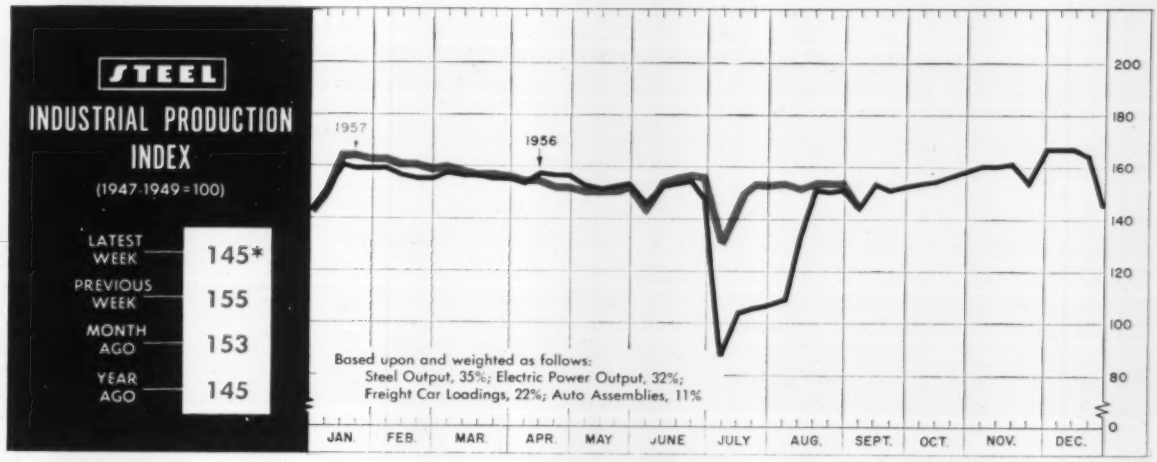
Timken Company engineers are always ready to study your problems, recommend the most economical tube size for your hollow parts job—a size guaranteed to clean up to your dimensions. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

See the first Timken Televent hour, in color, "Eleven against the ice—story of the Antarctica Turnpike". NBC-TV, Monday night, Sept. 23.



*Week ended Sept. 7.

Near-Record Fourth Quarter Shaping Up

EXPECTATIONS for the fourth quarter are running high. Some businessmen don't see how it can miss being the best quarter on record. Others think it will just miss the level of 1956's last quarter. A few speak "guardedly" of better business levels.

The groundwork for this upswing is being established now, and many economists and businessmen believe that some clue to it will be found in steel mill operations, auto production, and home building. All three show signs of strengthening by the end of the year.

Detroit Guesswork—Most crystal balls are focused on motordom because of the coming new models and because dealers' inventories are at near record levels. Completely new cars will be the exception rather than the rule this year, but facelifts will be extensive. Both factors account for the optimism regarding the close out of '57s and the introduction of '58s. August sales were good. The daily average swelled as the month progressed and "deals" became more enticing.

The key question for '58 is public resistance to price increases, which could be almost as big as they were last year. Automen feel that practically all the cars sold in record-setting 1955 are now paid for—a point they miscalculated a year ago. A sizable replacement market is in prospect, but the difference between '55 and '58 prices could hurt it. The industry is watching the Edsel for signs of resistance because it gives an indication of the 1958 price pattern.

Suppliers say that Detroit is optimistic. Orders for parts standard on both '57s and '58s are strong, indicating that motordom's high inventories, which plagued partmakers this year, are nearly worked off. Orders from steel mills are beginning to pick up, too. Officially, automakers are planning operations for about the same pace as last year's, but nobody would

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,126[1]	2,073	2,477
Electric Power Distributed (million kw-hr)	11,400[1]	12,147	10,955
Bituminous Coal Output (1000 tons)	9,995[1]	9,880	9,600
Petroleum Production (daily avg—1000 bbl)	6,750[1]	6,766	7,037
Construction Volume (*ENR*—millions)	$314.1	$436.5	$243.9
Auto, Truck Output, U. S., Canada (*Ward's*)	110,354[1]	142,982	66,618
TRADE			
Freight Car Loadings (1000 cars)	655[1]	745	680
Business Failures (Dun & Bradstreet)	262	260	237
Currency in Circulation (millions)[3]	$31,145	$30,998	$30,787
Dept. Store Sales (changes from year ago)[3]	+5%	+1%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,202	$20,496	$16,828
Federal Gross Debt (billions)	$273.8	$273.7	$275.6
Bond Volume, NYSE (millions)	$12.6	$17.6	$15.6
Stocks Sales, NYSE (thousands of shares)	5,479	9,998	7,154
Loans and Investments (billions)[4]	$86.5	$87.0	$85.6
U. S. Govt. Obligations Held (billions)[4]	$24.9	$25.3	$26.6
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.71
STEEL's Nonferrous Metal Price Index[6]	209.3	213.7	262.7
All Commodities[7]	118.1	118.0	114.8
Commodities Other Than Farm & Foods[7]	125.6	125.6	122.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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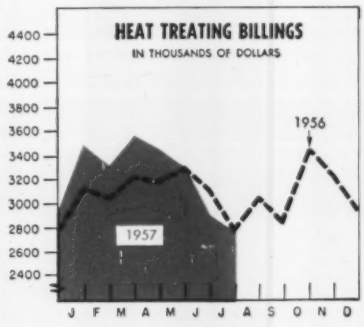
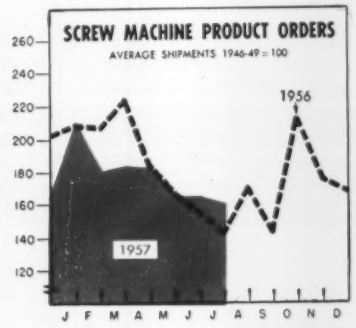
INDUSTRIAL GLOVES

Plants in Philadelphia, Pa., and Warsaw, Ind.
In Canada: Safety Supply Company, Toronto

THE BUSINESS TREND





	1957	1956	1955
Jan.	3,494.7	3,116.4	2,181.0
Feb.	3,337.9	3,124.8	2,184.5
Mar.	3,571.6	3,330.9	2,599.5
Apr.	3,462.6	3,166.2	2,579.5
May	3,311.4	3,350.7	2,644.4
June	2,912.1	3,094.5	2,645.1
July	2,767.5	2,737.4	2,180.0
Aug.	.....	3,040.7	2,535.6
Sept.	.....	2,832.9	2,666.8
Oct.	.....	3,442.3	2,897.2
Nov.	.....	3,205.7	2,935.7
Dec.	.....	2,931.2	2,891.1

Metal Treating Institute.

	New Orders 1957	New Orders 1956	Shipments 1957	Shipments 1956
Jan.	211	208	206	216
Feb.	181	207	185	214
Mar.	185	224	197	213
Apr.	183	184	193	199
May	167	165	192	178
June	166	154	173	178
July	162	142	141	137
Aug.	...	170	...	172
Sept.	...	143	...	164
Oct.	...	213	...	202
Nov.	...	175	...	180
Dec.	...	167	...	167
Avg.	...	179	...	186

National Screw Machine Products Assn.

Charts copyright, 1957, STEEL.

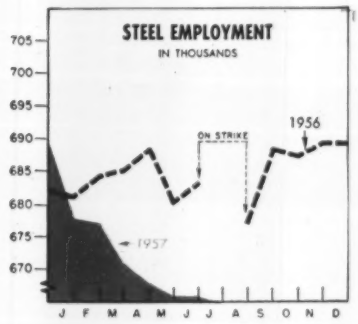
be surprised to see them boost output in late November or December.

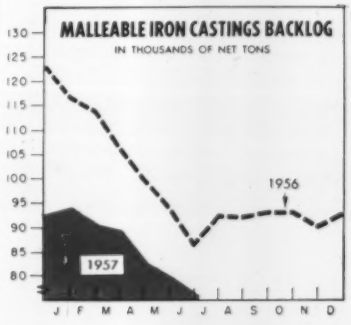
Home Building Comeback—Construction industry analysts are dusting off their rose colored glasses, too. The consensus: The worst is over for home building, and an upturn is starting which will push starts in 1958 up over the 1 million mark. Harold Braman, executive manager of the National Savings & Loan League, believes that the period of tightness in credit for home loans is passed and that the supply of mortgage credit will increase moderately this fall. "Home building will finish the year fairly strong," he says, but adds that it may be at the expense of some other segments of the economy. As other lines of business taper off under the government's anti-inflation program, Mr. Braman believes that some investment funds will switch back into home building. Other observers feel that lower down payments and higher interest rates sanctioned by the government this summer will turn the trick.

Effects on Steel — The home building outlook is adding to the optimism within the appliance industry, and this is being reflected on the orders placed with steel mills. Continued high operations in heavy construction, electrical and nonelectrical machinery, and metal fabricating, coupled with an upturn in auto and appliance markets, could keep the steel mills busy during the fourth quarter. Peak operations at around 90 per cent of capacity during December would surprise nobody, with the quarter averaging about 86 or 87 per cent. That's all that is needed to give 1957 a record equaling 117 million tons of steel and turn 1957 from an "off" year into a pace setter.

Shipments Improve

According to the Department of Commerce, something of an upturn may have started as long ago as July, when manufacturers' sales rose above the June level on a seasonally adjusted basis. They hit $29 billion. Only twice before —last January and February— have sales gone above that mark. Durable goods shipments reached a seasonally adjusted $14.7 billion, the third highest mark in history. New orders for manufactured goods also increased moderately, although the durable goods sector





	Employment in Thousands		Payroll in Millions	
	1957	1956	1957	1956
Jan.	678	681	$360.4	$329.1
Feb.	677	684	327.5	317.3
Mar.	671	685	344.2	338.1
Apr.	668	688	331.5	326.7
May	666	680	338.0	333.6
June	666	683	324.8	332.4
July	665	n.a.	334.6	n.a.
Aug.	...	677	....	300.9
Sept.	...	688	....	339.0
Oct.	...	687	....	358.9
Nov.	...	689	....	346.0
Dec.	...	689	....	347.2

n.a.=not available because of strike.
American Iron & Steel Institute.

	Shipments		Unfilled Orders*	
	1957	1956	1957	1956
Jan.	86.0	93.6	93.9	116.5
Feb.	78.0	93.6	90.7	113.6
Mar.	78.0	86.9	89.4	106.5
Apr.	80.3	83.3	83.1	99.6
May	76.5	78.8	79.8	93.7
June	72.6	75.6	76.3	86.2
July	...	54.3	...	92.1
Aug.	...	74.4	...	91.9
Sept.	...	69.4	...	92.6
Oct.	...	81.5	...	92.7
Nov.	...	82.7	...	90.0
Dec.	...	76.4	...	92.3
Total ...	...	950.5		

*For Sale. U. S. Bureau of the Census.

remained unchanged at $13.2 billion. This resulted in a further decline in unfilled orders to $59.4 billion for all manufacturing and $56.3 billion for durable goods industries. Total inventories advanced $200 million (all of it in durable goods) after holding at $53.9 billion for two months.

Consumer Credit Jumps

Total consumer credit advanced another $120 million in July to a record $42.365 billion, reports the Federal Reserve Board. The gain so far this year has been lower than that of the corresponding period last year. Up to Aug. 1, consumers added $1.449 billion to their total debt, about 11 per cent under the corresponding figure for last year. Installment gains for the two years are practically equal, but the addition to automotive paper this year is 17 per cent ahead of the pace set in 1956. Repayments amounted to a record $3.35 billion, seasonally adjusted.

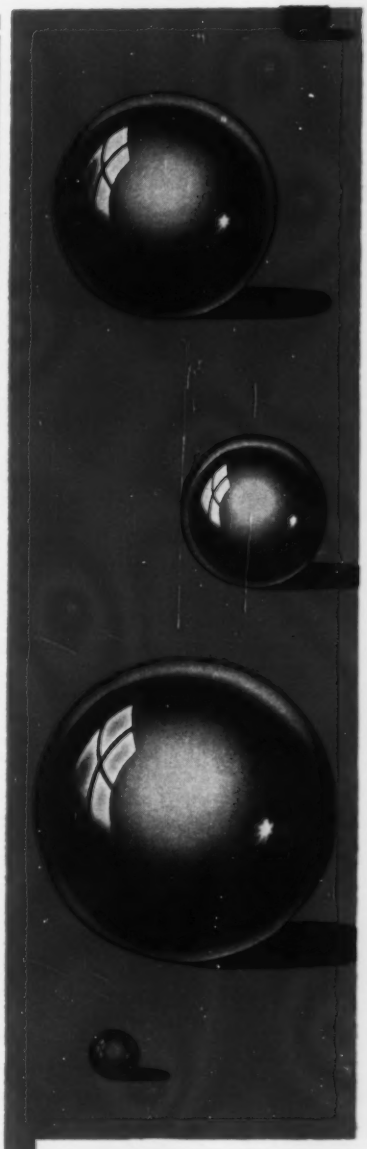
Trends Fore and Aft

• After trailing the year-ago month in May and June, total billings for the heat treating industry in July amounted to $2,767,500 (see chart, Page 98), a gain of 1.1 per cent over July, 1956, says the Metal Treating Institute, New Rochelle, N. Y.

• For the metal furniture industry, July was one of the best months of 1957, says the National Association of Furniture Manufacturers. Orders were 13 per cent ahead of those in the year-ago month, and July shipments moved 47 per cent ahead of those in the 1956 month. This year trails 1956 by only 8 per cent in orders and 3 per cent in shipments.

• Sales of used machine tools in July declined from 137 per cent of the 1947-49 average to 125.3 per cent, reports the Machinery Dealers National Association. This was in the same month that orders for new machine tools showed a gain of 29.6 per cent.

• New orders of screw machine products in July dipped 4 points to 162 (1947-49=100), less than the seasonal drop of the preceding five years, reports the National Screw Machine Products Association, Cleveland. They were 114 per cent of the 1956 level of business (see chart, Page 98). Shipments also dropped seasonally to 141 per cent of the base period.



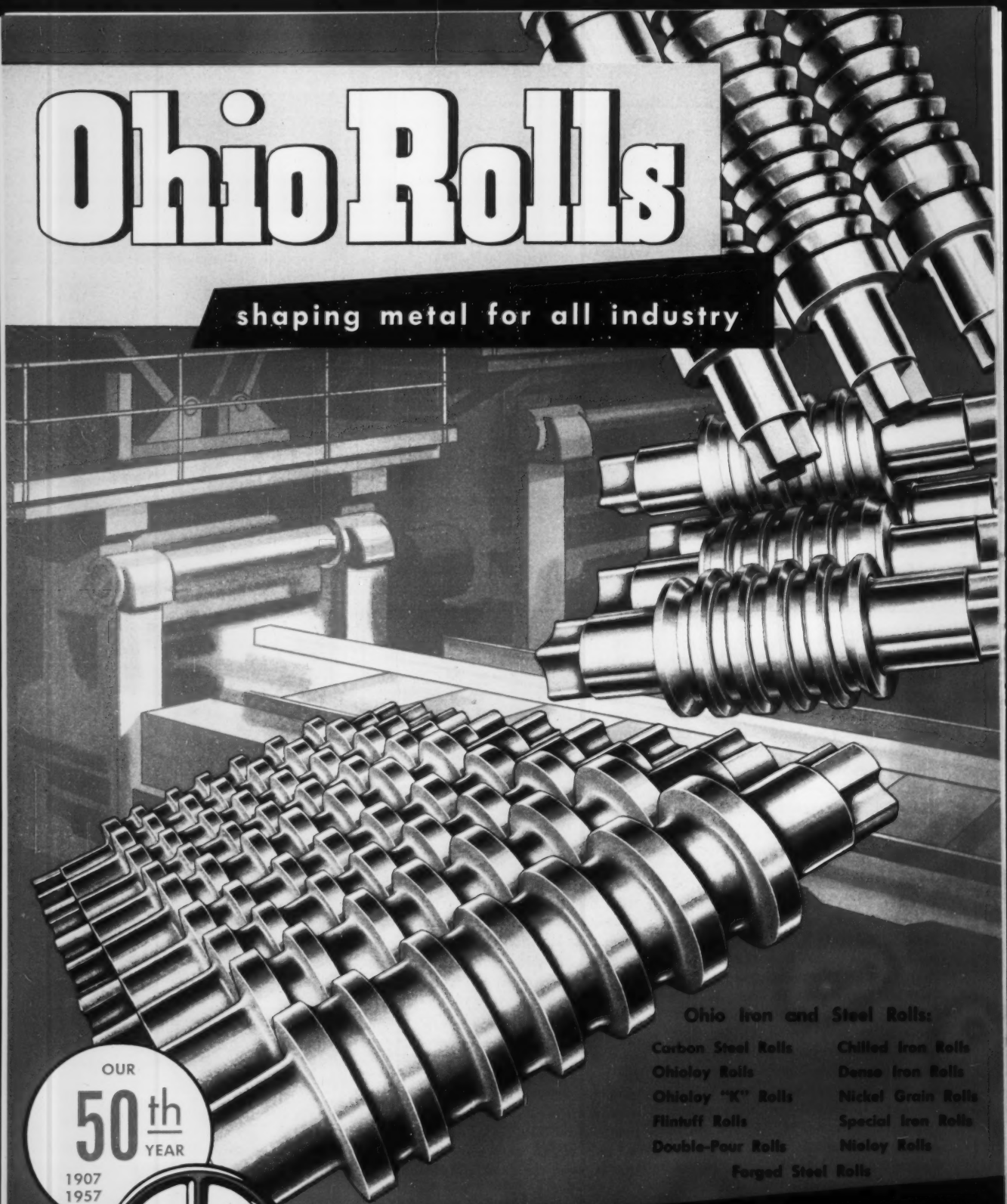
COOLIDGE
Balls

CHROME ALLOY
AND
STAINLESS

COOLIDGE CORPORATION
MIDDLETOWN, OHIO

Ohio Rolls

shaping metal for all industry



Ohio Iron and Steel Rolls:

Carbon Steel Rolls	Chilled Iron Rolls
Ohioloy Rolls	Dense Iron Rolls
Ohioloy "K" Rolls	Nickel Grain Rolls
Flintuff Rolls	Special Iron Rolls
Double-Pour Rolls	Nioloy Rolls
Forged Steel Rolls	

OUR 50th YEAR
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1957

THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO

Plants at Lima and Springfield, Ohio

OR14

JOHN V. BOARDMAN
Green River Steel v.p.-gen. mgr.

EDMUND SYLVESTER
heads American Ship Building

MADDEN T. WORKS
Dresser Turbodrill operations

EDWARD C. LEIBIG
Corhart Refractories president

Jessop Steel Co. named **John V. Boardman** vice president and general manager of its subsidiary, **Green River Steel Corp.**, Owensboro, Ky. **J. B. Riley** was made secretary-controller. Mr. Boardman was vice president-operations.

Edmund Sylvester succeeds **Robert B. Ackerman**, retired, as president of **American Ship Building Co.**, Cleveland. Formerly chairman of the executive committee, Mr. Sylvester is succeeded by **Herbert P. Ladds** who is president of National Screw & Mfg. Co. Mr. Sylvester was president of Griffin Wheel Co. He left that company in 1955 to start a firm in the Union of South Africa to make cast wheels by pressure pouring. He has also worked as a consulting engineer since 1955.

Bernard J. Beierla was appointed chief metallurgist of **Springfield Foundry Co.**, Indian Orchard, Mass. He is in charge of metallurgy and quality control. Mr. Beierla was chief metallurgist with E. W. Bliss Co.

Michael Bender was made metallurgist and welding engineer with Blaw-Knox Co.'s **Buflovak Equipment Div.**, Buffalo.

Paul E. Anders was made chief industrial engineer for **Chrysler Div.**, Chrysler Corp., Detroit.

Kenneth A. Hawkins was named sales manager, central U. S., for **E. F. Hauserman Co.**, Cleveland. He is replaced as Chicago branch manager by **James W. Tyrer.**

Madden T. Works was made manager of operations, **Dresser Turbodrill Div.**, Dresser Industries Inc., Dallas. He was president of Pioneer Specialties Inc.

Jack H. Smith was made manager of districts, a new post in the sales division of **Wolverine Tube Div.**, Calumet & Hecla Inc., Detroit. He was manager of Wolverine's east central sales district and is replaced by **Richard B. Flynn**, with headquarters in Detroit.

Daniel F. Darney was made manager, stainless steel products division, **U. S. Steel Supply Div.**, U. S. Steel Corp., Chicago.

John Petrovich was made sales manager and assistant to the general manager at **Mohawk Tools Inc.**, Montpelier, Ohio.

R. B. McCarthy was made chief engineer of **Surface Combustion Corp.'s** steel mill division, Toledo, Ohio.

L. D. Deal was elected president of **Lyon Metal Products Inc.**, Aurora, Ill., to succeed the late **H. B. Spackman.** Mr. Deal was secretary and treasurer. **A. W. Walan** was elected secretary-treasurer; **J. B. Gossett**, assistant treasurer.

John A. Hawkins was appointed vice president-sales, **Bristol Steel & Iron Works Inc.**, Bristol, Va. He was manager of sales.

William A. Schubert was made engineer in charge of rotary compressor sales, **Allis-Chalmers Mfg. Co.**, Milwaukee.

Edward C. Leibig was elected president, **Corhart Refractories Co. Inc.**, Louisville. He succeeds **Hugh L. Kline**, appointed field sales manager, television sales department, Corning Glass Works, parent company. Mr. Leibig continues as general manager of the refractories division at Corning.

William S. Perkins was made director of purchases for **Westinghouse Electric Corp.'s** general products group, Pittsburgh. He was purchasing agent at the small motor division, Lima, Ohio.

William R. Harkness was promoted to sales manager, **Seaboard Pacific Div.**, Associated Spring Corp., Gardena, Calif. He was sales supervisor.

Harlan T. Pierpont was made sales manager, electrochemical division, **Norton Co.**, Worcester, Mass. **Frederick J. Rutland** was made manager of sales engineering for that division. **Frank B. Huke** was made manager of atomic product sales, refractories division, and **George H. Powers** was made manager of distribution for that division.

Paul W. Leming was elected executive vice president, **Van Norman Machine Co. Div.**, Van Norman Industries Inc., Springfield, Mass. He was works manager of King Machine Tool Div. and Elmes Engineering Div., American Steel Foundries.

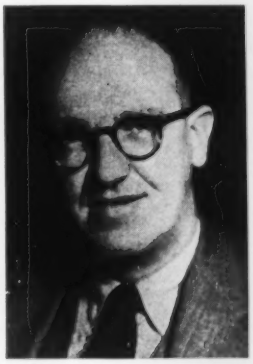
John L. Cotsworth was appointed staff manager-stainless steel for **Chase Brass & Copper Co.**, Water-

PETER J. LUCHINI

JOHN ENOS

Colonial Engineering promotions

JAMES A. ROEMER



ALFRED M. TREDWELL JR.

Sharon Steel chairman and president

bury, Conn. He was sales manager at Northeastern Steel Corp.

Colonial Engineering Co. Inc., Cambridge, Mass., promoted **Peter J. Luchini** from general manager to vice president-general manager; **John Enos** from plant manager to vice president and production manager.

D. J. Bond, for many years Detroit district manager of Lapointe Machine Tool Co., resigned to become sales representative of the special products division of **Colonial Broach & Machine Co.**, Detroit.

J. William Snyder joined the sales department's technical service staff at **Universal-Cyclops Steel Corp.**, Bridgeville, Pa., as stainless metallurgist. He was assistant superintendent, wide band department, Bridgeville plant.

Paul R. Christiansen was made district sales manager for **Granite City Steel Co.'s** Memphis, Tenn., office. He succeeds **Howard J. Poland,** retired.

W. N. Murray was named manager, Boston branch office, **American Air Filter Co.** He succeeds **Robert E. Reid,** appointed a special sales engineer, working out of the Boston office.

Bernard Campbell was made plant manager, **Calstrip Steel Corp.**, Los Angeles.

Clyde Wilson was made manager, erection division, **Truscon Steel Div.**, Republic Steel Corp., Youngstown. He succeeds **L. F. Michels,** now assistant manager of sales, architectural products.

James A. Roemer was elected chairman; **Alfred M. Tredwell Jr.**, president of **Sharon Steel Corp.**, Sharon, Pa. **Henry A. Roemer** relinquishes his posts as chief executive officer, chairman, and president to continue as chairman of the executive committee. Mr. Tredwell was vice president-operations. James Roemer will continue as president of Mallory-Sharon Titanium Corp.

Harold C. Erskine was made general manager in charge of smelting and fabricating operations at **Aluminum Co. of America,** Pittsburgh. **Raymond T. Whitzel** retired as vice president and general production manager.

Paul V. Malloy was appointed vice president - operations, **Kemet Co. Div.,** Union Carbide Corp., Cleveland.

Leonard H. Seeman was named manager, products sales engineering department, **Greer Hydraulics Inc.**, Jamaica, N. Y.

Dr. Robert B. Costello was made assistant manager, materials department, **Aerophysics Development Corp.**, Santa Barbara, Calif., subsidiary of Curtiss-Wright Corp.

Lloyd G. Backart was elected vice president-sales for **Rapistan-Keystone Co. Inc.**, Detroit, effective Oct. 1. He was assistant sales manager for Rapids-Standard Co., affiliate firm.

Robert C. Long was made New York regional manager, **Lamson Corp.**

E. S. Fraser was made assistant general sales manager at Chicago for **Chicago Bridge & Iron Co.**

Lawrence R. Keenen was made eastern regional engineering manager, systems division, **Beckman Instruments Inc.** He is at the Mountainside, N. J., plant.

Arthur P. Hesse was made Cincinnati district sales manager, **Aluminum Safety Products Inc.**

Ralph Reynolds, formerly technical sales manager of **Acoustica Associates,** Mineola, N. Y., was made general sales manager.

John A. Eckel, assistant to the general superintendent, Fairless Works, **U. S. Steel Corp.**, was appointed assistant to the general manager-steel operations at Pittsburgh.

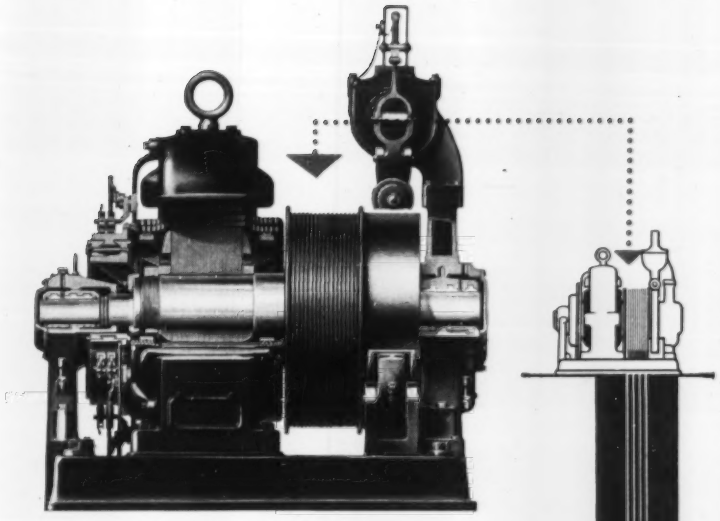
Edgar W. Percy was made assistant sales manager, **Williams Bucket Div.**, McDowell Co. Inc., Cleveland.

N. J. Kassnel was made district manager of the new Cleveland sales office of **Verson Allsteel Press Co.**

E. E. Karlins succeeds the late **E. W. Samuel** as manager of the Oakland, Calif., plant of **Fenestra Inc.**

Maryland Shipbuilding & Drydock Co., Baltimore, appointed **Robert J. Patrick** assistant to the senior vice president; **James A. McQuaid,** assistant to the director of purchases.

I. Ray Darr was named manager, **Industrial Fabricating Co.**, Toledo, Ohio. He was purchasing agent



Otis Elevators Use HANNA PIG IRON

to support their ups and downs

Rough finishing a one-piece sheave rim and brake pulley casting in the Otis Elevator Company's Yonkers foundry.

Center of action in the mechanism of Otis Elevator Company's high-speed (up to 1,400 ft. per minute) Autotronic passenger elevators is the one-piece cast iron drum shown in place in the top picture and in rough form below. Half of the drum serves as a sheave rim for the elevator's cables, the other half as a brake pulley. To maintain the high standards of quality and performance demanded of these drums, Otis Elevator's foundry at Yonkers, N. Y., casts them with Hanna Pig Iron.

The Hanna range includes the Hanna 38-pound pig, the foundryman's favorite standard, in all grades, silvery and HannaTite, a specially controlled, close-grain iron. Also available is the HannaTen, a smaller ingot, with finer grain structure and no free carbon pockets. For prompt, expert handling of your pig iron requirements, call your Hanna representative at any time

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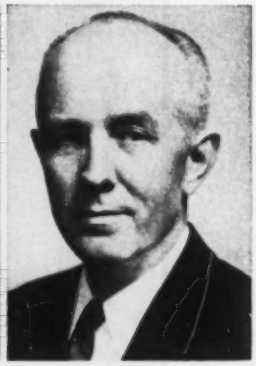
JACOB W. COX
AS&W gen. supt.-Duluth Wks.

J. J. BALINT
Pittsburgh Steel purchasing post



R. D. BRADFORD
heads Federated Metals Div.

JOHN MONTEAN
Cri-Dan Div. manager

R. J. MILLER
Ford div. chief engineer

EDWARD M. GRADY
Western Brass Mills post

of Toledo Pipe Threading Machine Co.

John Montean was made manager, **Cri-Dan Div.**, Lees-Bradner Co., Cleveland. He was assistant manager.

R. J. Miller was made chief engineer, tractor and implement division, **Ford Motor Co.**, Birmingham, Mich. In his new post, he is responsible for all engineering operations of the division and will be in charge of the company's farm machinery research and engineering center in Birmingham.

James T. Wilson was made a special representative of **Nordberg Mfg. Co.'s** subcontracting and new products department. He is in Washington.

W. R. Beall was named sales manager for the electronics division, **Clary Corp.**, San Gabriel, Calif.

David J. Belock was named manager of **Clark Controller Co.'s** newly opened San Francisco office.

Edward M. Grady was named sales manager of mill products, **Western Brass Mills Div.**, Olin Mathieson Chemical Corp. He is at East Alton, Ill.

Jay E. Watson was made chief engineer-conventional gages of **Pratt & Whitney Co.'s** gage division, West Hartford, Conn. Mr. Watson was chief of the Ordnance Gage Center at Frankford Arsenal.

O. H. Mackley was appointed vice president and general manager of **Hycon Electronics Inc.**, Pasadena, Calif., subsidiary of Hycon Mfg. Co.

Albert H. Clarke, vice president-engineering, **Crouse - Hinds Co.**, Syracuse, N. Y., was named vice president-manufacturing. **Russell P. Northrup** becomes vice president-engineering.

Malcolm B. McTernen, account executive for **Luria Bros. & Co. Inc.**, transfers to the Ohio area office in Cleveland. He was in the New Jersey and eastern Pennsylvania areas.

Jacob W. Cox was made general superintendent of the Duluth Works, **American Steel & Wire Div.**, U. S. Steel Corp. He succeeds **C. A. Purbaugh** who was named assistant manager of operations for the Duluth district. Mr. Cox was director of raw materials in the office of the vice president in Cleveland.

J. J. Balint was promoted from senior clerk to buyer in the purchasing department of **Pittsburgh Steel Co.**, Pittsburgh.

R. D. Bradford, vice president, American Smelting & Refining Co., New York, was placed in charge of the company's **Federated Metals Div.**

OBITUARIES...

F. R. McFarland Sr., 62, Houston works manager, **Sheffield Div.**, Armco Steel Corp., died Aug 30.

Earl H. Goodby, 66, vice president and treasurer, **Sanson & Rowland Inc.**, Philadelphia, died Sept. 6.

S. S. Hibbard, 57, chief engineer, **Dobbie Foundry & Machine Co.**, Niagara Falls, N. Y., died Sept. 1.

Mathew G. Sternberg, 68, consultant to **Blaw-Knox Co.**, East Chicago, Ind., foundry, died Sept. 4. He was president of Continental Foundry & Machine Co. until that company was purchased in 1955 by Blaw-Knox.

John H. Drennen, 49, chief hydraulics engineer, **Commercial Shearing & Stamping Co.**, Youngstown, died Sept. 5.

Robert S. Rose, Boston district manager, **Latrobe Steel Co.**, died Aug. 26.

Edgar L. Longaker, 75, for many years manager of design engineering for **Exide Industrial Div.**, Electric Storage Battery Co., died Aug. 29 in Norristown, Pa.

Otis Hutchins, 68, former director of research for **Carborundum Co.**, Niagara Falls, N. Y., died Aug. 27.

Ray DeKalb, vice president, **Apex Hard Chrome Co.**, Cleveland, died Sept. 1.

Columbia Tool Steels for 1957-58
with A.I.S.I. Identification and Type Classification of Tool Steels

GRADE	Identifying Elements, in Per Cent										
	Type	C	Mn	Si	Cr	Ni	V	W	Mo	Co	Cb
WATER HARDENING TOOL STEELS — TYPE SYMBOL W											
Columbia SPECIAL	W1	.60/1.40	—	—	—	—	—	—	—	—	—
Columbia EXTRA	W1	.60/1.40	—	—	—	—	—	—	—	—	—
EXTRA HEADERDIE	W1	.60/1.40	—	—	—	—	—	—	—	—	—
Columbia STANDARD	W1	.60/1.40	—	—	—	—	—	—	—	—	—
Columbia ELECTREX	W1	.60/1.40	—	—	—	—	—	—	—	—	—
VANADIUM EXTRA	W2	.60/1.40	—	—	—	—	.25	—	—	—	—
VANADIUM STANDARD	W2	.60/1.40	—	—	—	—	.25	—	—	—	—
	W3	1.00	—	—	—	—	.50	—	—	—	—
	W4	.60/1.40	—	—	.25	—	—	—	—	—	—
WATERDIE EXTRA	W5	1.10	—	—	.50	—	—	—	—	—	—
WATERDIE STANDARD	W5	1.10	—	—	.50	—	—	—	—	—	—
	W6	1.00	—	—	.25	—	.25	—	—	—	—
	W7	1.00	—	—	.50	—	.20	—	—	—	—
SHOCK RESISTING TOOL STEELS—TYPE SYMBOL S											
BUSTER	S1	.50	—	—	1.50	—	—	2.50	—	—	—
	S2	.50	—	1.00	—	—	—	—	.50	—	—
	S3	.50	—	—	.75	—	—	1.00	—	—	—
	S4	.55	.80	2.00	—	—	—	—	—	—	—
CEC SMOOTHCUT †	S5	.55	.80	2.00	—	—	—	—	.40	—	—

†With smooth cutting free machining additives

First of a Series of Six Charts Covering A.I.S.I. Tool Steel Type Classifications

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILLINOIS

CENTRAL OFFICE AND WORKS, CHICAGO HEIGHTS, ILLINOIS — BRANCH STOCKS IN THE FOLLOWING CITIES:

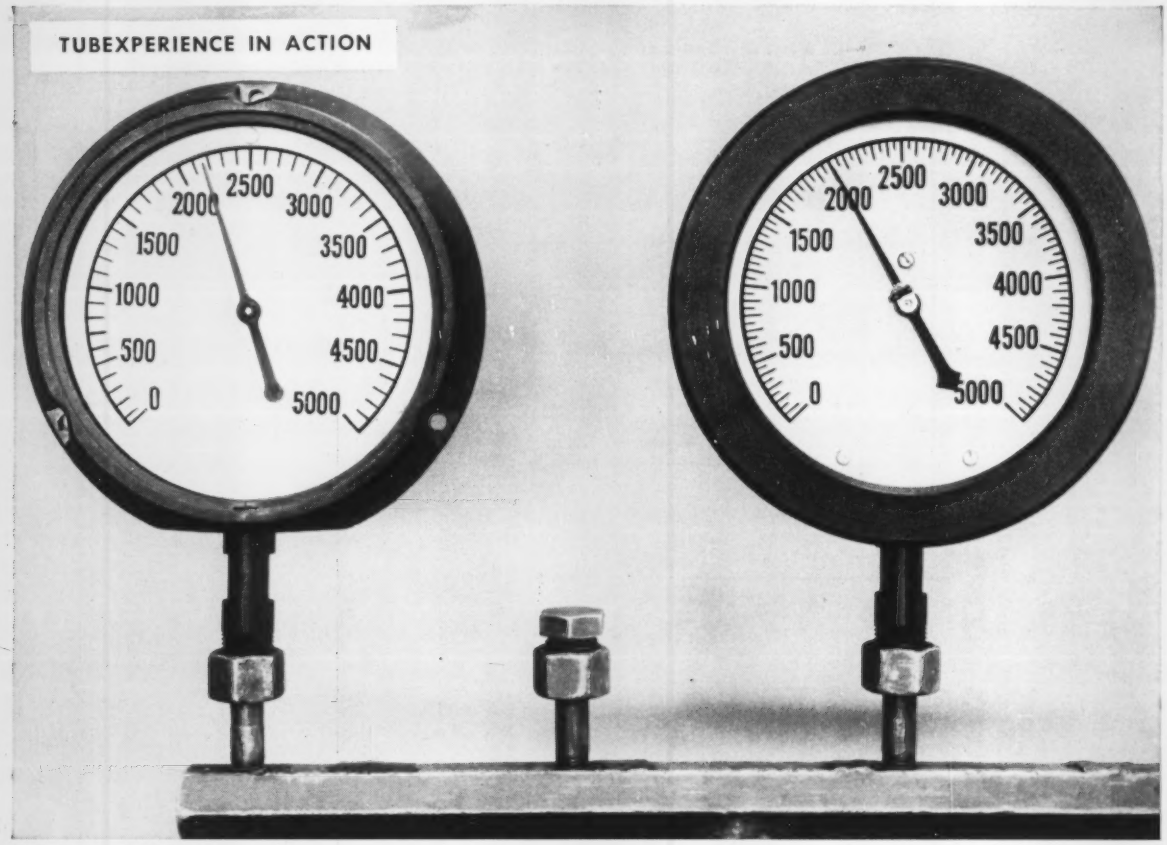
Chicago 32, 4832 S. Kedzie Ave., Phone LAfayette 3-3632
Cincinnati 25, 2716 Spring Grove Ave., Phone MUlberry 1-8400
Cleveland 14, 1640 St. Clair Ave., Phone MAin 1-1785
Detroit 3, 121 Oakman Blvd., Phone TUlsa 3-3770
Los Angeles 22, 6955 E. Bandini Blvd., Phone RAymond 3-4684
Milwaukee 19, 5202 W. Lincoln Ave., Phone LIncoln 3-5200
St. Louis 13, 5118 Easton Ave., Phone FOrest 1-0641

REPRESENTATIVES IN THE FOLLOWING CITIES: Dayton, Erie, Grand Rapids, Hartford, Indianapolis, Louisville, Moline, Newark, Portland and St. Paul

TOOL COLUMBIA STEELS

COLUMBIA TOOL STEELS

HIGH SPEED STEELS: Clarite — Vanite — Carvite — Acmite — Cobite — Maxite — Molite — Molite Smoothcut — Molite × 3 DIE STEELS: Superdie — Atmodie — Atmodie Smoothcut — E-Z-Die Smoothcut — Oildie — Exl-Die — Framdie HOT WORK STEELS: Clarite HW — Formite No. 3 — Formite No. 2 — Molite HW10 — Vanadium-Firedie — Alcodie — Firedie



Q. Which gage tells the truth longer?

A. *The gage with the Superior extra-quality Bourdon tube*

HERE'S WHY—

Quality cannot be inspected into tubing. Thus at Superior the quality is built in from start to finish. Stock for redrawing is carefully selected and prepared. Superior's method of producing Bourdon tubing includes many special techniques, developed through years of "tubexperience." Such factors as surface quality, close dimension control, freedom from decarburization, accurate shaping and cleanliness, all combine to produce a Bourdon tube of unexcelled quality.

Cheap Bourdon tubing no economy. Why risk having your gages fail or lose their accuracy? Inferior quality Bourdon tubing will crack, develop leaks, or take a set long before Superior's will show any signs of wear.

Quality Bourdon a must. The Bourdon tube represents only a small fraction of the total cost of your gage, yet it is the most important single element. Be sure to get only the best Bourdon tubing available.

Specify Superior. There are 8 different Bourdon analyses to choose from, including Ni-Span C. Flat ovals, ellipticals, rounds and partial rounds, etc. For technical data on Superior extra-quality Bourdon tubing, write for a free reprint of "Bourdon Elements Require Special Tubing." Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to $\frac{5}{8}$ in. OD—certain analyses in light walls up to $2\frac{1}{2}$ in. OD

West Coast: Pacific Tube Co., 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331

Gets Navy Contracts

Westinghouse will build radar and armament systems at airport plant in Baltimore

CONTRACTS to produce $19 million worth of shipboard and aerial electronic equipment for the Navy have been awarded to Westinghouse Electric Corp.

The projects cover defense systems for the Navy Bureau of Aeronautics and air-search radar sets for the Bureau of Ships. They will be produced at the company's Friendship Airport plant, Baltimore. The contracts represent continuations of programs, says B. M. Brown, vice president in charge of Baltimore divisions.

The defense system involves a $10 million production schedule that will continue into 1959. This equipment directs the unmanned tail turret of bombers by detecting enemy aircraft and automatically aiming and firing tail guns. It will be used in the Navy's carrier-based A3D.

Air-search shipboard radar equipment will be installed aboard Navy ships after mid-1958.

Timken To Buy Furnace

Timken Roller Bearing Co., Canton, Ohio, will install a consumable electrode, vacuum electric furnace with a capacity of about 200 tons a month. It can produce 24 in. ingots. Directors of the company have appropriated $500,000 for the project. Steel for higher stressed bearing applications (for vital aircraft parts and use in the guided missile program), will be produced.

Harley-Davidson To Move

Harley-Davidson Motor Co., Milwaukee, will close its plant in that city and move all operations to its plant in Butler, Wis. It has a floor area of about 275,000 sq ft.

Electromet Forms Division

New metallurgical products with unique properties will be offered through a new Fine Metals & Chemicals Div., established by Electro Metallurgical Co., a division of Union Carbide Corp., New York. Appointments to the division at Niagara Falls, N. Y., include: C. M. Brown, manager; T. R. Evans, metallurgical engineer in charge of sales; and L. A. Stoyell, metallurgical engineer in charge of manufacturing.

Awards Reactor Contract

Argonne National Laboratory, Lemont, Ill., awarded a contract to United Engineers & Constructors Inc., Philadelphia, for the design of a boiling water reactor facility. It's for the laboratory's Idaho Div. site. The facility will cost $8.5 million.

Scott Equipment Expanding

Scott Equipment Co., Dayton, Ohio, is constructing a $160,000 building at 272 Leo St., that city. Containing about 8000 sq ft of floor space, it will be completed about Dec. 15.

Enters Drop Forging Field

Federal Steel Corp. has been organized, with executive offices in Ellwood City, Pa., and manufacturing facilities in Beaver County, Pennsylvania. The firm's principal product is drop forgings. Officers are: Chairman and president, J. G. Cartwright; executive vice president and treasurer, Boyd E. Zeigler; vice president and secretary, Paul J. Cartwright Jr.

Radio Control for Plants

A complete line of radio control equipment for industrial applications will be marketed by CG Electronics Corp., a subsidiary of Gulton Industries Inc., Metuchen, N. J.

The transistorized receivers are available in single or multichannel equipment with operating ranges up to 50 miles.

To Produce Crash Trucks

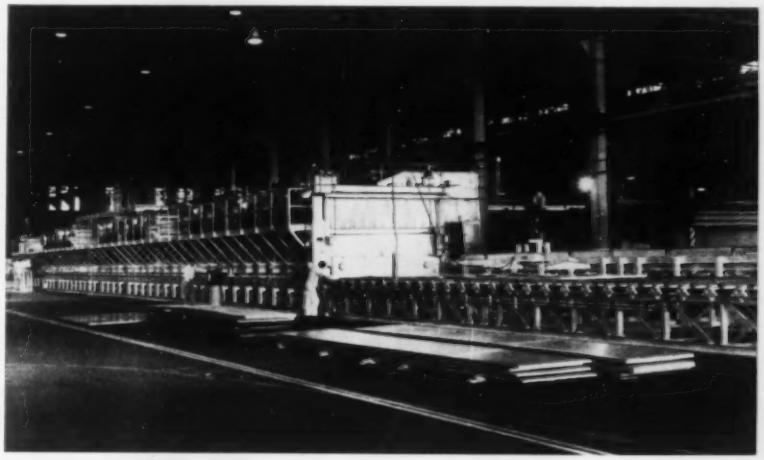
Walter Motor Truck Co.'s plant at Voorheesville, N. Y., will begin operation soon. The firm, employing about 200, will make airport crash trucks under an Air Force contract.

Metals Firm Renamed

Groma Trading Corp., New York, has changed its name to Groma Metal Corp. It is a supplier and technical consultant on the rarer and complex metals, alloys, scrap, and residues.

Opens Missile Division

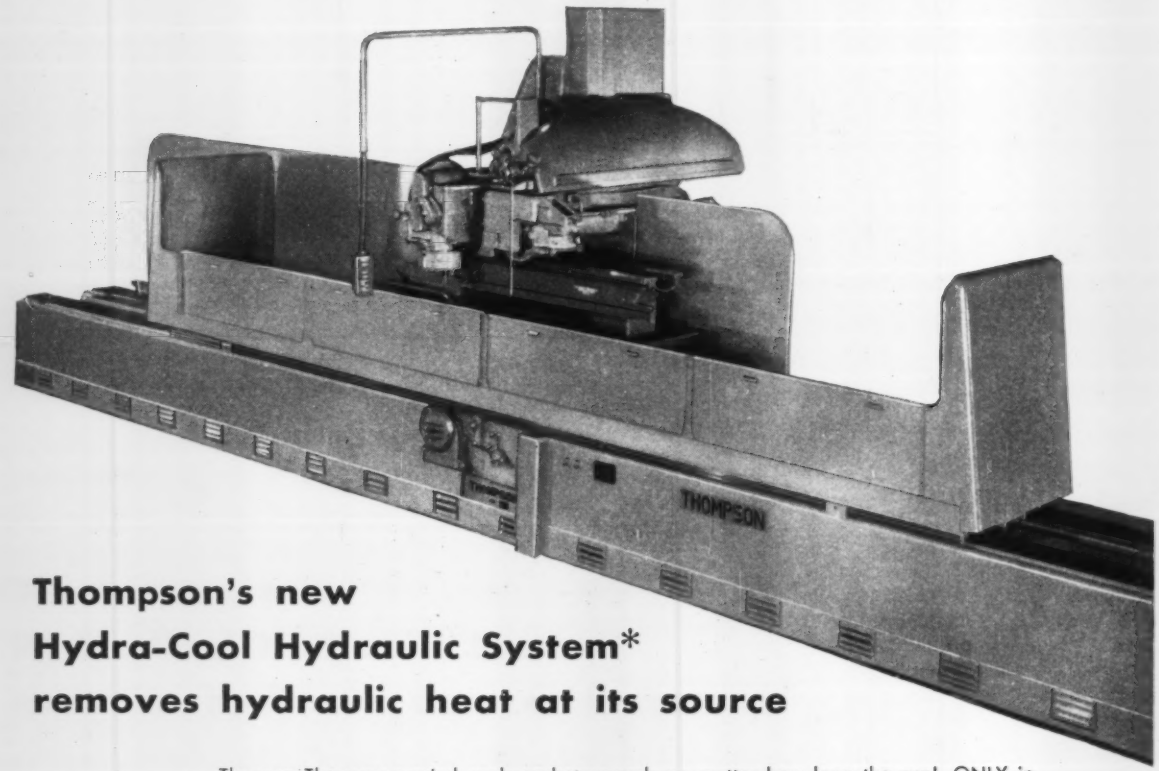
Packard-Bell Electronics Corp., has established a missile equipment section in a 21,000 sq ft plant



Kaiser Installs 400-Ft Heat Treat Furnace

This $500,000 continuous furnace for large aluminum alloy plates was put into service recently at Kaiser Aluminum & Chemical Corp.'s plant, Trentwood, Wash. Plates up to 5 in. thick, 110 in. wide, and 50 ft long can be processed in the electric furnace. Heat treatment imparts high strength to metal for aircraft and other structural uses

HYDRA-COOL



Thompson's new Hydra-Cool Hydraulic System* removes hydraulic heat at its source

The new Thompsons grind cool—and stay cool—no matter how long the run! ONLY in this new hydraulic system can you get these important, exclusive advantages—

- Hydra-Cool eliminates heat damage to the hydraulic seals, valves, controls and pump.
- Hydra-Cool will not break down the additive-type hydraulic oils—sludge will not form in the Hydra-Cool System.
- Hydra-Cool eliminates the usual lengthy warm-up period required to bring production surface grinders up to working temperature.
- Hydra-Cool saves you money on power costs.

Hydra-Cool is standard on all Thompson surface grinders 40 inches and up in work length AT NO EXTRA COST.

*Pat. Applied For

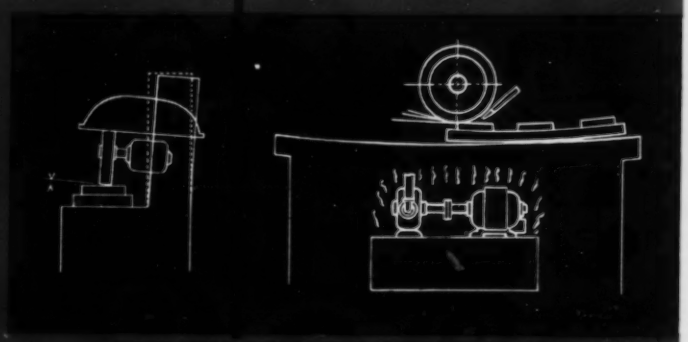
"KEEP Thompson *IN MIND FOR THAT DAILY GRIND"*

Constant

ASSURES ACCURACY

HEAT DISTORTION IS ELIMINATED IN THOMPSON SURFACE GRINDERS

As shown at right, heat distorts the column of a surface grinder from its true vertical alignment, causing the column to bend back from the work table. This further destroys the machine's accuracy.



HOW HEAT DISTORTS A SURFACE GRINDER

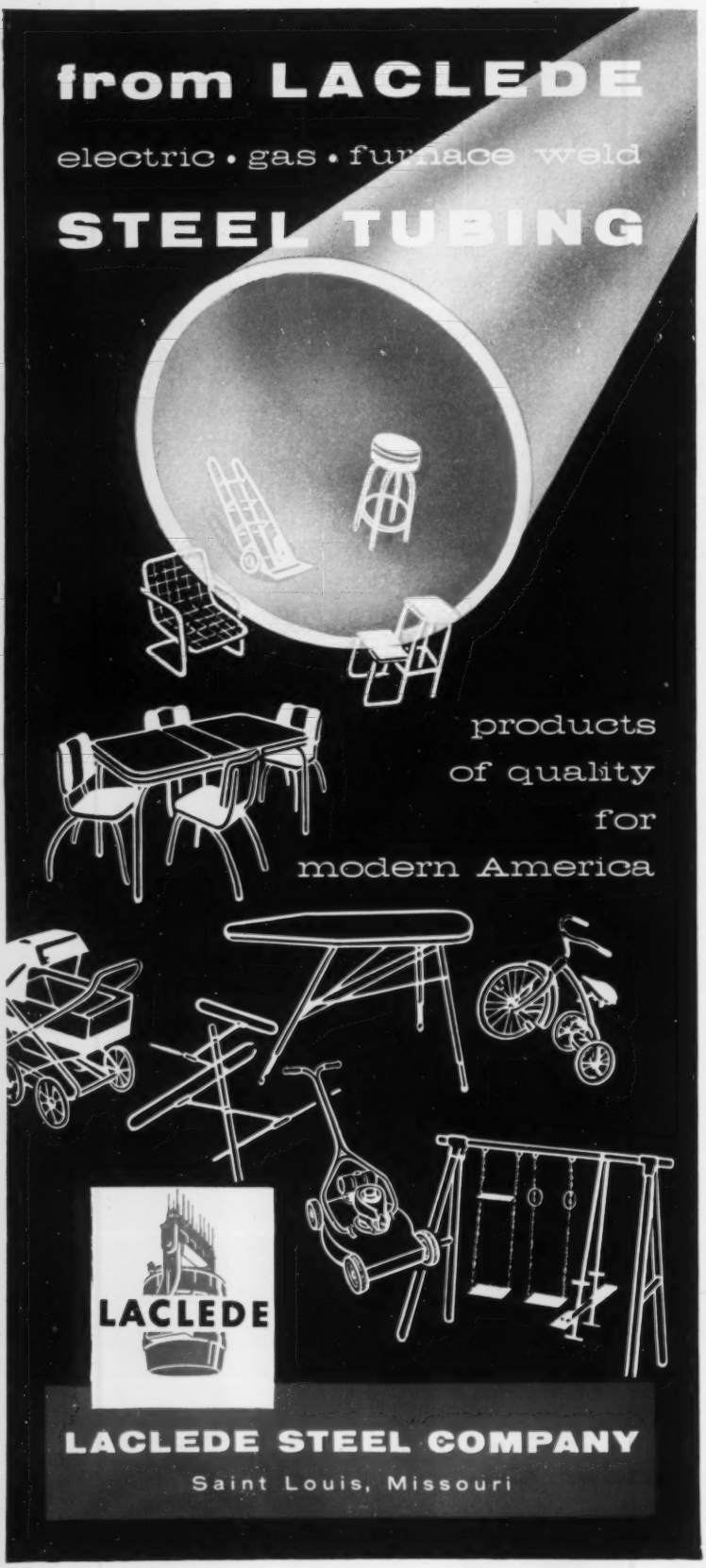
Coolant, splashing and evaporating on the work table, cools the top surface, which contracts. Hydraulic heat, ranging from 50° to 70° above ambient temperatures, heats the bottom surface of the table, which expands. This causes the whole table to become concave. As shown in the exaggerated drawing above, any work being ground during this distortion is ground too heavily on the ends of the table and not enough in the middle. Surface flatness and parallelism cannot be maintained.

No more than a few degrees rise above ambient temperature is found in the Hydra-Cool System! Distortion is eliminated—accuracy is assured.

SEND FOR DESCRIPTIVE HYDRA-COOL FOLDER

The Thompson Grinder Co.
14 Zeischler Street
Springfield, Ohio, U. S. A.

Thompson
SURFACE
GRINDERS



at Santa Monica, Calif. It will continue to work on the design, development, and manufacture of ground test and launching equipment for the Douglas Thor IRB missile.

New Rolling Mill

Techalloy Co. Inc., Rahns, Pa., has awarded a purchase contract to H. J. Ruesch Machine Co., Newark, N. J., for a Model 210, 4 high rolling mill. It will provide precision rolled strip in Monel, Inconel, Inconel "X," nickel, stainless, and heat resisting steels.

Improves Facilities

Straight line production for electric ranges is being installed in Greenville, Mich., by Gibson Refrigerator Co., a division of Hupp Corp. When the transfer of operations is completed, refrigerator, range, and freezer operations will be centered in Greenville.

New Name

Clingan & Fortier Inc., San Francisco, subsidiary of Reynolds Metals Co., has changed its name to Reynolds Aluminum Supply Co. The firm has 11 warehouses in the Far West.

Land Purchased

A 40-acre industrial site in Sharon, Pa., has been acquired by Shenango Metal Craft Co. It plans to expand operations as an engraver of stainless steel plates and plot the land for light industrial sites.

Buys Land

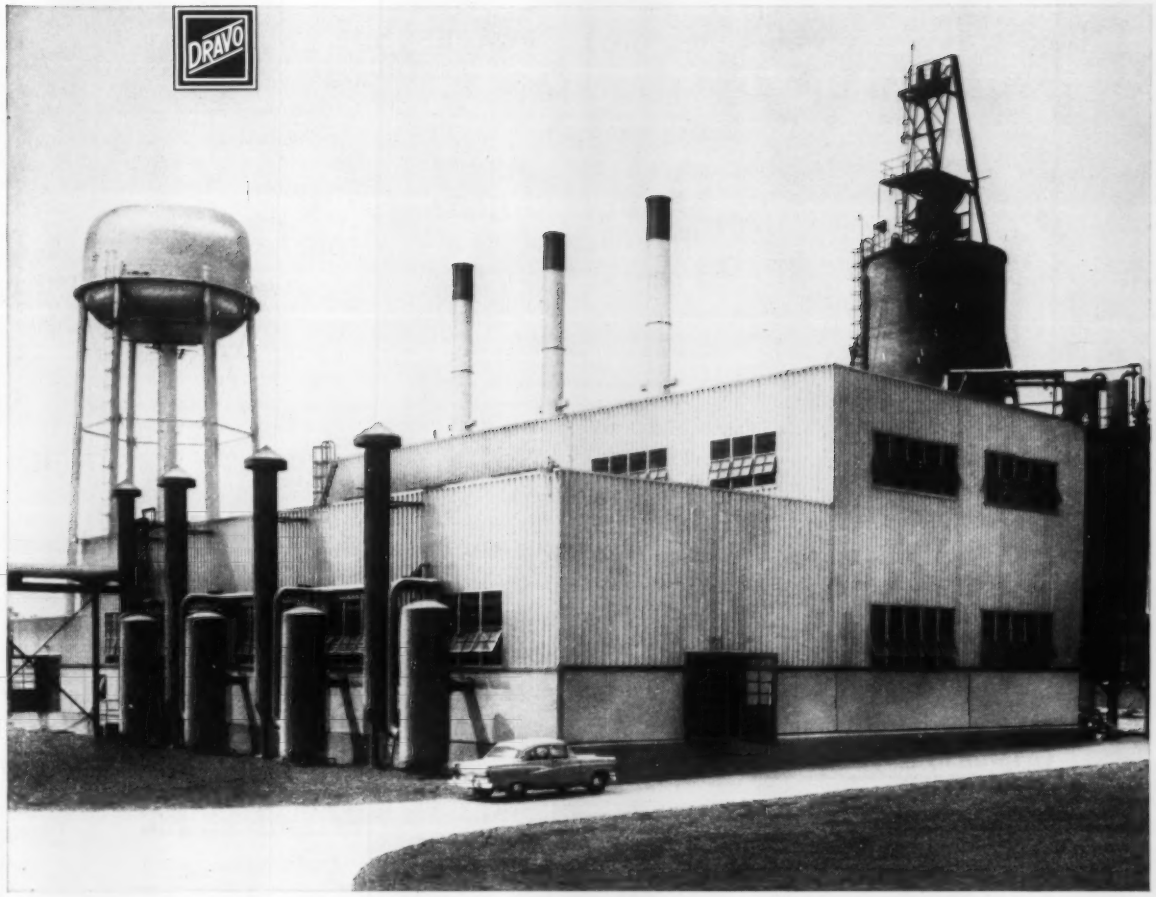
Electronic Engineering Co. of California purchased 530,000 sq ft of land in Santa Ana, Calif., for expansion.

San Diego Firm Expands

Gretch Machine Tool Co., San Diego, Calif., added a 10,000 sq-ft building to its facilities. It is expected to increase production capacity by 80 per cent.

MacDermid Pacific Formed

MacDermid Inc., Waterbury, Conn., and Detroit, manufacturer



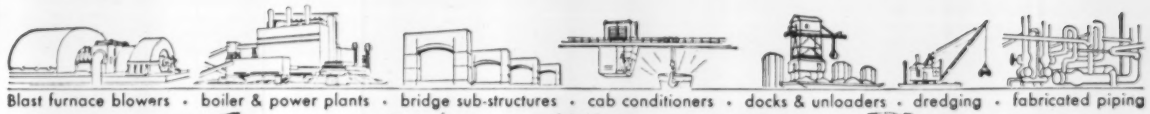
Five "turn-key" boiler plants for FORD

Five new Ford Motor Company factories will have Dravo-built steam generating and air compressor plants similar to this one in Sterling Township near Detroit. Three are in operation, the fourth and fifth are under way. First of these turnkey projects was built in 1955. Ford engineers specified design requirements . . . Dravo handled engineering-construction, procured equipment and erected the complete plant.

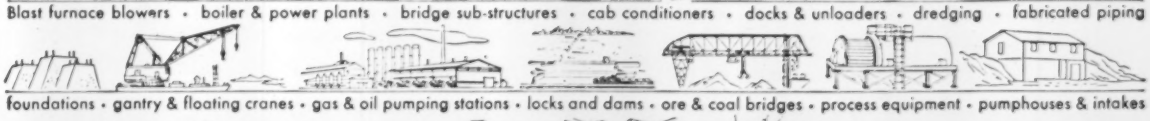
Dravo has built more than 80 power and steam generating plants for both industrial and central station use. The combination of pipe fabrication facilities and construction experience produces low cost plants that are economical to operate and maintain.

Your next construction project may benefit by making use of this teamwork. For information on this, or any of the products and services listed below, write DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

DRAVO
CORPORATION



Blast furnace blowers • boiler & power plants • bridge sub-structures • cab conditioners • docks & unloaders • dredging • fabricated piping



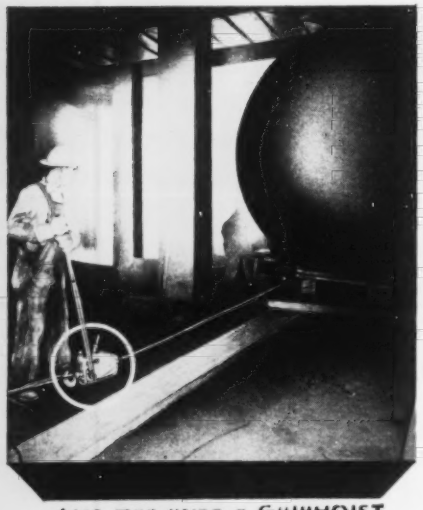
foundations • gantry & floating cranes • gas & oil pumping stations • locks and dams • ore & coal bridges • process equipment • pumphouses & intakes

river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

GRIPHOIST TIRFOR Saves Man-hours for You in Plant Installation and Maintenance

One man using

GRIPHOIST TIRFOR often Does the job of a crew of 4 to 6 men



One man using a GRIPHOIST places heavy tank in 5 minutes

- Factory — one man using GRIPHOIST placed 3 sections of 40,000 lb. machine in minutes
- Maintenance — overhead lift jobs handled when power machinery unavailable
- Rigger — 2 men moved 40-ton load from truck to foundation — in lieu of costly set-up
- Construction — 6 GRIPHOISTS saved 1000 man-hours removing false-work on 12-span overpass
- Vans — Trucks — GRIPHOIST loads and unloads girders, angles and plates

Manually operated, GRIPHOIST weighs 42 lbs; rated for 3300 lbs. single line to 6 tons 4-part line; unlimited travel ½" cable.

Ask your dealer or write

Princeton Griphoist, Inc. 32 GEORGE STREET • BOSTON 19, MASS.

Griphoist, Inc. 424 BRYANT STREET • SAN FRANCISCO 7, CALIF.

S STANDS FOR *Sterling* AND *Satisfaction!*

The "S" stamped on the back of every Sterling Wheelbarrow symbolizes Sterling quality and satisfaction in barrow transportation. It is our way of letting you know that Sterlings are built from the finest materials by skilled craftsmen.

STERLING WHEELBARROW CO., MILWAUKEE 14, WIS.

Welded tray, all-steel construction with reinforced tubular steel frame, channel steel legs and roller bearing wheel with pneumatic tire. Assures smooth wheeling and perfect balance.

***Sterling* WHEELBARROWS**

A 5479-⅛

of metal cleaning, plating, and finishing chemicals, opened a new division, MacDermid Pacific Inc., 18802 Fonthill, Torrance, Calif. It is operating manufacturing, warehousing, sales, and service facilities under the direction of C. E. Weekly.

Enters Ultrasonic Field

P. M. Platzman has formed a new company in the ultrasonic industry with headquarters in Mineola, N. Y. The organization will make ultrasonic cleaning machines and metalworking equipment.

Gulton Gets Tool Rights

Gulton Industries Inc., Metuchen, N. J., has been licensed for the production of a Laminagage under patent rights held by General Motors Corp., Detroit. This production tool is used to check platings and coatings on metals and other electrically conductive materials. It measures to extremely fine tolerances and can detect pinholes and flaws in production line items not readily seen by inspectors.

Research on Foil

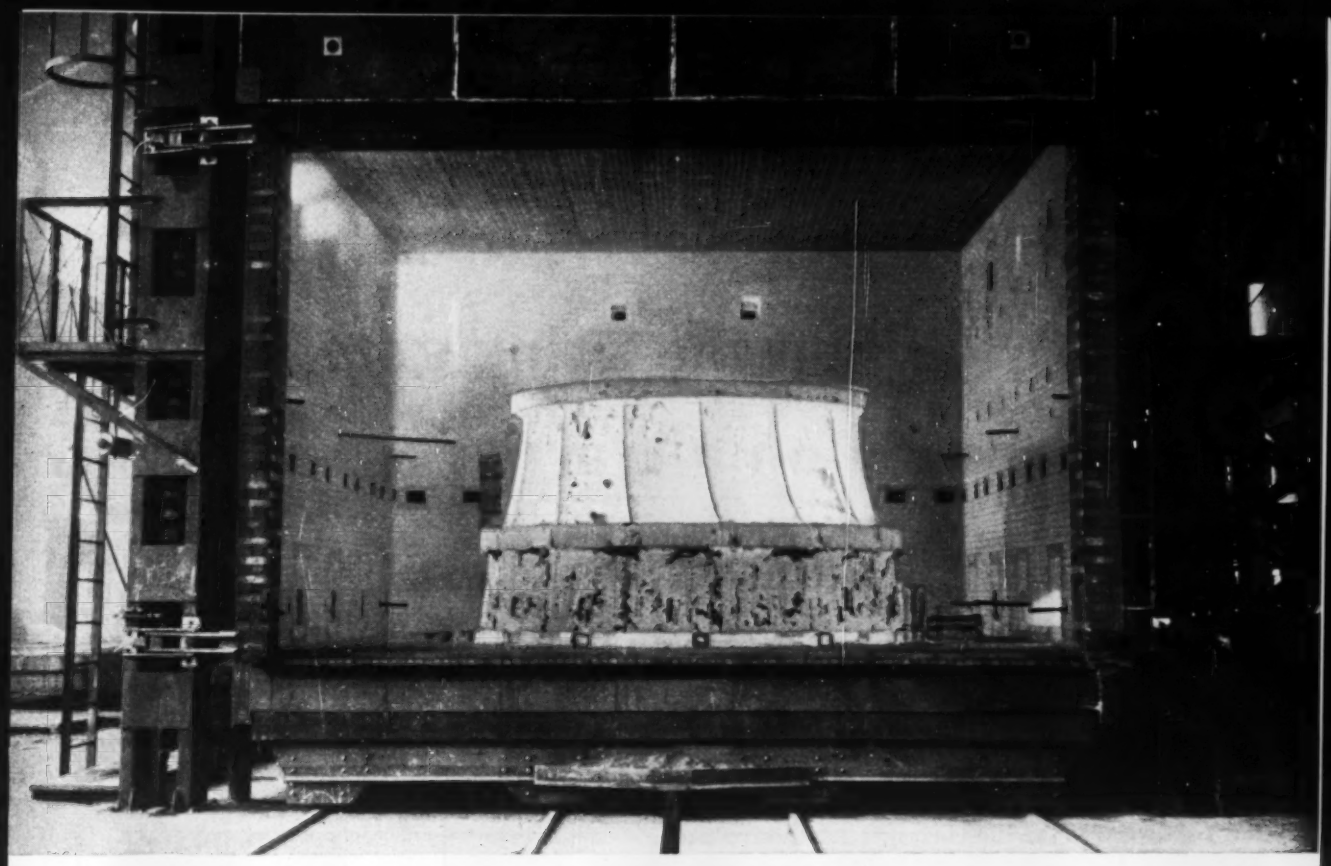
Fundamental research for the foil and packaging industries will be carried on in the Foil and Packaging Div. of Alcoa Research Laboratories, New Kensington, Pa.

The laboratory is at work on a number of foil ideas for construction, electrical, home decorating, food processing, printing, packaging, and pharmaceutical use.

CONSOLIDATIONS

Directors of **Ray-O-Vac Co.**, Madison, Wis., and **Electric Storage Battery Co.**, Philadelphia, have "agreed in principle" on merger terms. Ray-O-Vac produces dry cell batteries, and the Philadelphia firm makes industrial and automotive storage batteries under the "Exide" name.

Stockholders of **Dobeckmun Co.**, Cleveland, manufacturer of flexible packaging, gift wraps, and me-



For best performance and maximum economy

7 different specialized refractories used in annealing furnace lining

Engineering a furnace lining with *specialized* refractories can save dollars on construction, fuel and maintenance as well as extend productive working time. To achieve these results, seven different B&W refractories were used in the lining of this 25′ x 23′ x 14′ annealing furnace.

Fuel savings and close temperature control were made possible by using three types of *lightweight* B&W Insulating Firebrick. Walls are composed of *B&W K-23 IFB* backed up with *B&W K-16*. Because of the proximity of the burners, the roof was constructed of *B&W K-26 IFB*, a higher temperature brick to guard against the effect of possible localized overheating.

The weight saving construction means about 100 lb less refractory material to heat up per sq ft than with ordinary firebrick, or about 28 tons less in the roof of the furnace. Furthermore, supporting steel is less massive, far less costly. Commercial size steel can be used for roof suspension instead of special steels.

To eliminate the need for expensive special shapes, the burner tunnels are formed of *B&W's 3000 F refractory castable, Kaocast*. Lintels over the burners and jambs are constructed of rugged *B&W Junior Firebrick*.

To take advantage of fast, easily installed castable construction, *B&W Kaocrete-D* was used in the nose arch (separately pictured). This sturdy castable with a 2500 F use limit was selected to provide strong resistance to abrasion caused by door operation. In addition, the need for costly fired shapes and their supporting castings was eliminated, as was a great deal of expensive engineering detailing.

Nose arch, cast of B&W Kaocrete D, immediately after removing forms.

The car top is insulated with *B&W Kaolite-20*, a 2000 F insulating refractory concrete.

For further information, write for B&W bulletin R-2-H on insulating firebrick and B&W bulletin R-35 on castables.

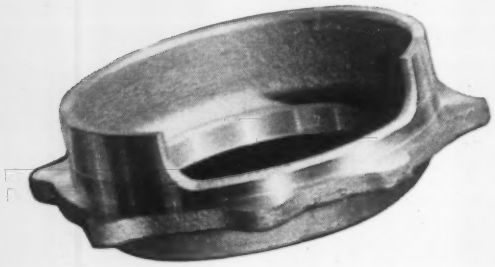
BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R-574

Another cost-conscious manufacturer finds that—

When the going gets tough ...put it on a Warner & Swasey



A modern Warner & Swasey Turret Lathe's cost-cutting combination of power, rigidity and accuracy has increased production of this piece 200% for R. H. Little Co. of Canton, Ohio.

TOUGH STEEL diesel-electric locomotive parts, designed by The Timken Roller Bearing Company, are run in 500-piece lots at the rate of 12 to 15 daily on R. H. Little's new Warner & Swasey 4-A Saddle Type Turret Lathe.

In addition to heavy stock removal, severely-interrupted cuts put a terrific strain on both tooling and machine. But their Warner & Swasey's power and rigidity easily handle this job.

This same casting was previously machined at the rate of only 5 a day when run on a 20-year-old lathe. Production was held down due to the machine's lack of horsepower and rigidity. This caused excessive downtime for tool changing and required constant operator attention to maintain required accuracy.

This is but another example of how today's alert metalworking management is profiting through the realization that... **When the going gets tough... put it on a Warner & Swasey.**

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

tallic yarns, approved the firm's merger with Dow Chemical Co.

REPRESENTATIVES

Tri - State Engineering Co., Washington, Pa., announced that Cargotainers and other material handling equipment formerly sold through the Pittsburgh Steel Products Div. of Pittsburgh Steel Co. will be sold through Tri-State.

Morristown Electrical Supply Co., Morristown, N. J., are the distributors of Asco solenoid valves produced by **Automatic Switch Co.,** Florham Park, N. J.

Torrington Co., Torrington, Conn., has appointed South East Machinery Co., Ft. Lauderdale, Fla., as the Florida representative for its swaging machines.

Heiland Div. of Minneapolis-Honeywell Regulator Co., Denver, announced that the sales and servicing of Heiland gas indicators will be handled by Johnson-Williams Inc., Palo Alto, Calif.

NEW OFFICES

A sales office in Jacksonville, Fla., has been opened by the **"Automatic" Sprinkler Corp. of America.** Address: Ames Bldg., 2721 Park St.

NEW PLANTS

Gibson Electric Co., Delmont, Pa., a producer of electrical contacts, has moved its manufacturing facilities and offices from Pittsburgh to a new plant in Delmont. All manufacturing, research, purchasing, marketing, sales, and office facilities are housed in the new building.

A new distribution center for the New England area is being built by **Becco Chemical Div.** of Food Machinery & Chemical Corp., Buffalo. The 6000 sq-ft facility will be in Framingham, Mass.

"for long, long blade life—

choose a DISSTON!"

Does your work call for close tolerance cutting . . . fine edge-holding qualities . . . good finish? Disston Metal Cutting Band Saws give you all that and more —*long, long blade life!*

LANCER TOOTH—Hard edge blade with positive rake angle tooth. Permits high-speed production cutting of non-ferrous metal, wood and plastic. Cuts brass and aluminum solids and Plexiglas with equal ease.

REGULAR TOOTH—Hard edge flexible back band saw with finer tooth spacing. Cuts all ferrous metals and thinner sections of non-ferrous metal and plastic. Excellent for sawing angle iron, steel tubing, nickel plate and brass sheets.

Your Disston distributor is the man to see if production is too low and costs too high. He can help you boost one and lower the other.

NEW BOOKLET—YOURS FREE!

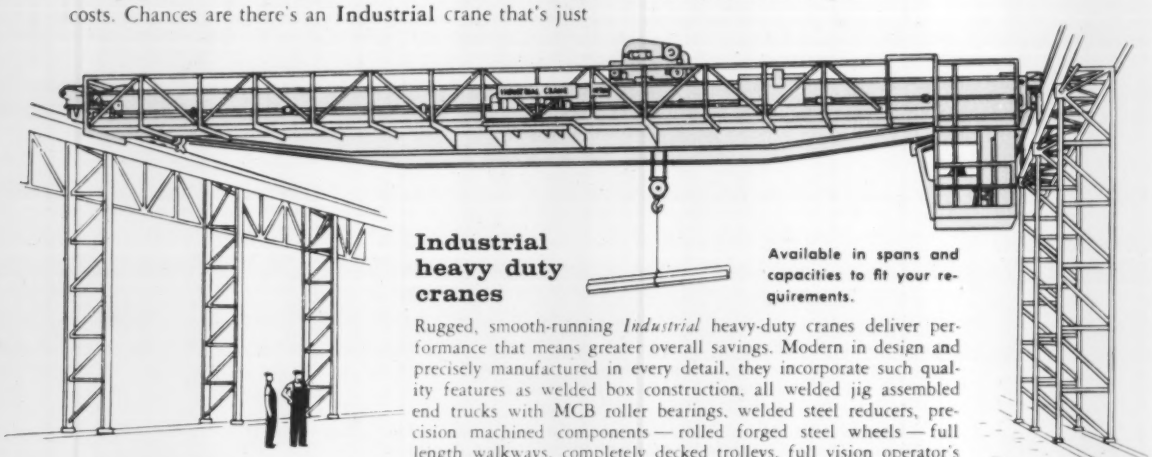
To obtain YOUR FREE COPY of Disston's colorful, information-packed booklet on Metal Cutting Band Saws, write today to Dept. 26. Henry Disston Division, H. K. Porter Company, Inc., Philadelphia 35, Pa.

H. K. PORTER COMPANY, INC.

Henry DISSTON DIVISION

Industrial Cranes...

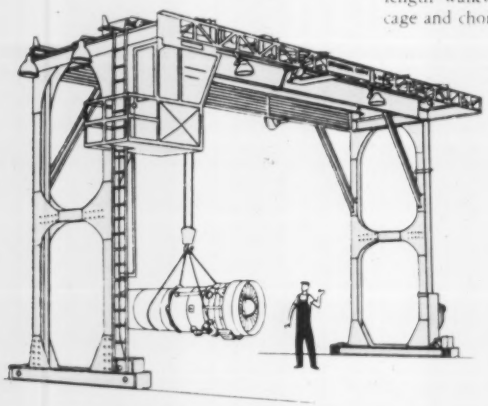
Industrial Cranes are skillfully engineered and carefully built to give you years of smooth-as-silk performance with a minimum of maintenance . . . performance that pays real dividends in reduced materials handling costs. Chances are there's an **Industrial** crane that's just right to solve your particular handling problem. Make your choice from the versatile **Industrial** line . . . our engineers will recommend the **Industrial** crane that's best for you in the long run.



Industrial heavy duty cranes

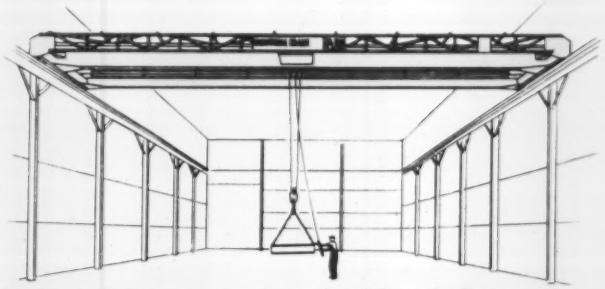
Available in spans and capacities to fit your requirements.

Rugged, smooth-running *Industrial* heavy-duty cranes deliver performance that means greater overall savings. Modern in design and precisely manufactured in every detail, they incorporate such quality features as welded box construction, all welded jig assembled end trucks with MCB roller bearings, welded steel reducers, precision machined components — rolled forged steel wheels — full length walkways, completely decked trolleys, full vision operator's cage and choice of electrical controls and motors.



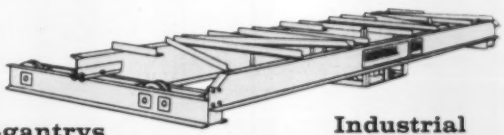
Industrial full gantrys

Available in many spans and capacities to fit practically any need and cycle of operation. They are ideal where travel is long and fixed overhead runways are not desirable.



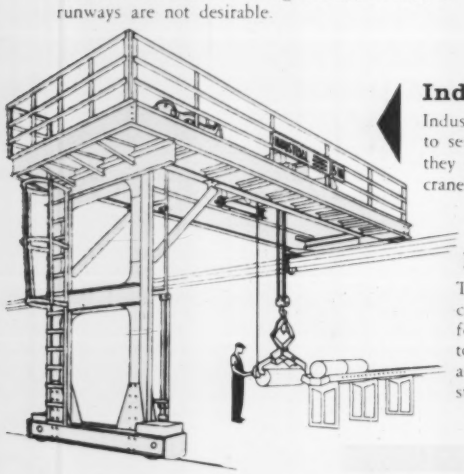
Industrial top-running double girder, motor driven cranes with outriggers

Capacities to 15 tons. Available in spans to 60 feet. Where service requirements are not heavy duty, these economical cranes built of standard wide flange beams are outstanding for service and reliability. Cab or floor controlled.



Industrial top-running single girder, motor driven crane with outriggers

Capacities up to 15 tons in spans to 50 feet. Ideal for many installations where service requirements are conservative.

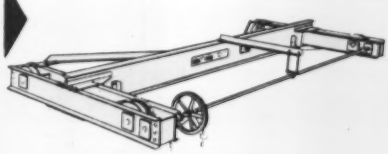


Industrial semi-gantrys

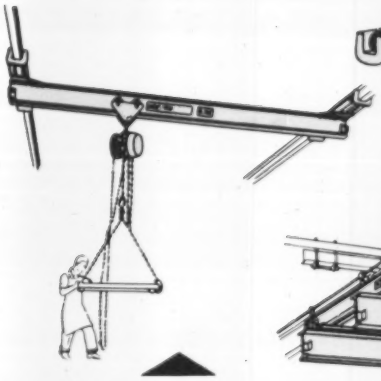
Industrial semi-gantrys often are used to serve local areas in a plant where they operate below the heavy overhead cranes freeing them for other work.

Industrial hand-geared cranes

Top-running crane (illustrated) capacities to 20 tons, spans to 60 feet. Underhung crane capacities to 10 tons, spans to 50 feet. Also available in double girder construction.

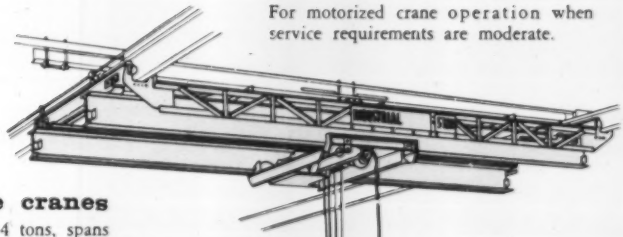


Your best investment for the long run...



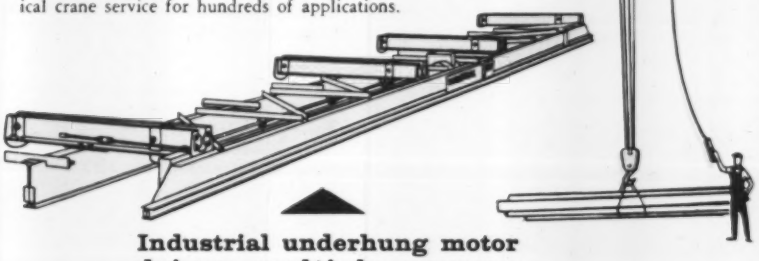
Industrial motor driven MDL cranes

For motorized crane operation when service requirements are moderate.



Industrial push-type cranes

Top-running crane capacities to 4 tons, spans to 30 feet. Underhung crane (illustrated) capacities to 2½ tons, spans to 28 feet. Economical crane service for hundreds of applications.

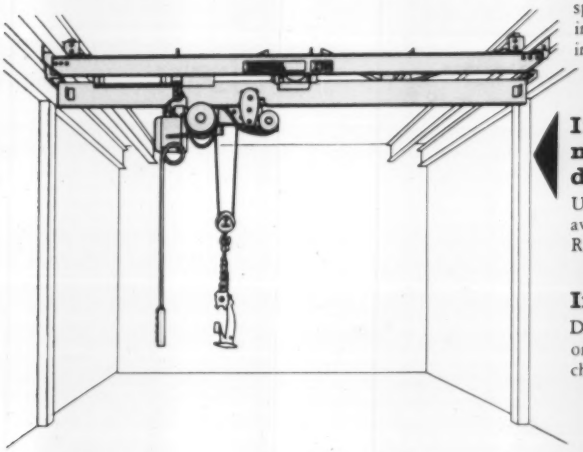


Industrial underhung motor driven multiple runway cranes

Suitable for extremely wide bays. Also available in double girder type.

Industrial underhung double girder motor driven cranes

Available in capacities to 15 tons and spans to 50 feet. These smooth operating, rugged cranes are ideal where building structure will support the weight.

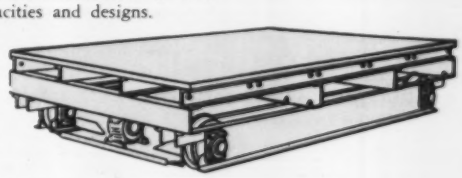


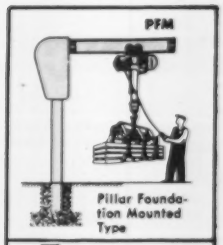
Industrial underhung motor driven single girder cranes

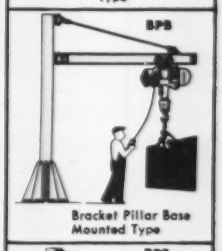
Using monorail hoists, these models are available in capacities up to 15 tons. Rugged and dependable.

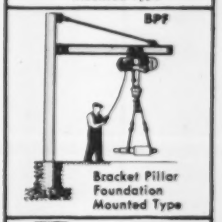
Industrial transfer cars

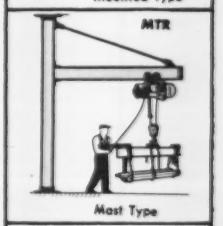
Designed for rugged service, with air or electric power. Available in a wide choice of capacities and designs.

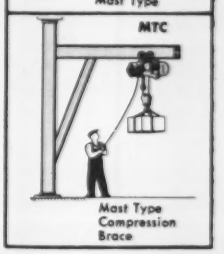












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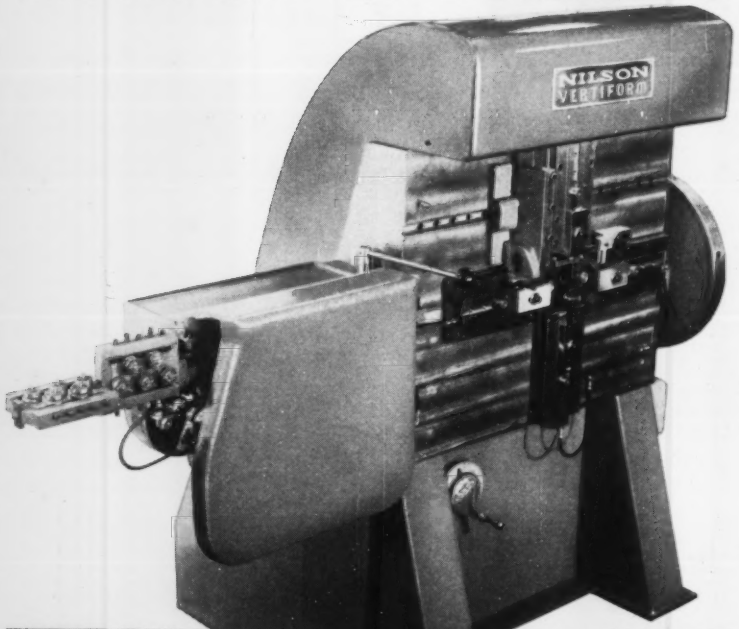

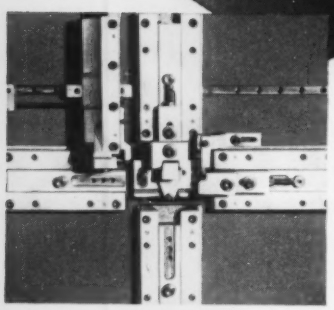

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MACHINE SPECIFICATIONS #V-187

- Max. diam. wire—inches ..... .187
- Max. length of feed—standard 15"
- Max. length of feed—with change gears ..... 30"
- Max. width ribbon metal .... 1¼"
- Stroke of forming slides ..... 2½"
- HP. required 2
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Write To Our New Plant For VERTIFORM CATALOG

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Get Set for Metalworking's Fabulous Future . . .

Make or Buy?

Should the prime producer make his components or buy them from subcontractors? Is it better to be a prime producer or a supplier?

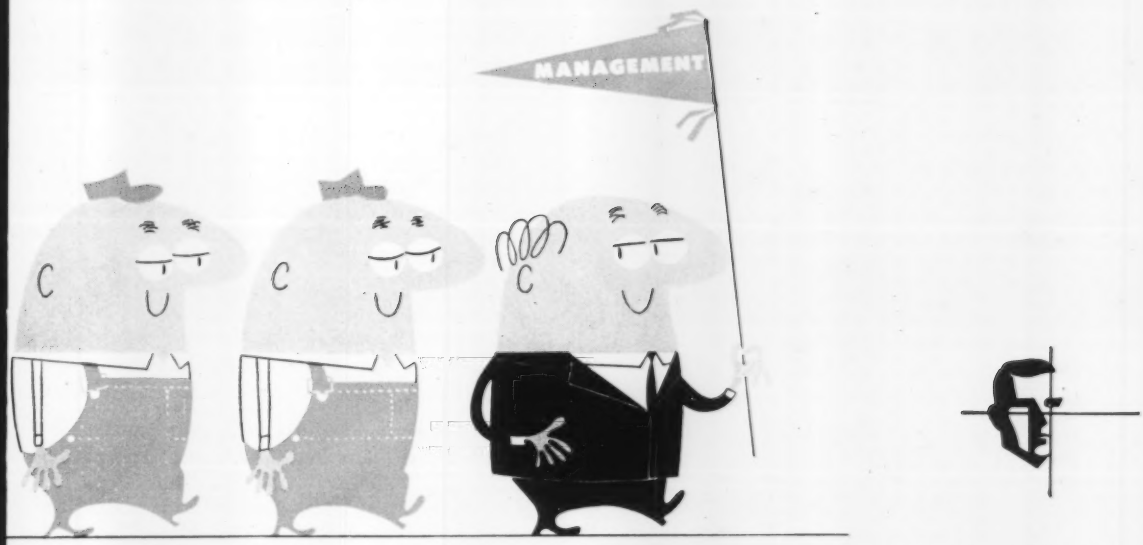
Long a dilemma, those questions are becoming even more crucial as industry makes plans to get set for metalworking's fabulous future.

To help you get set, read STEEL's ninth article in its 1957 Program for Management (coming Oct. 14). It will discuss factors that will influence the decision to make or buy, including cost, capacity, equipment, and technical knowhow.

Articles published to date:

1. **The Care and Feeding of the Junior Executive**
   (Feb. 11, Page 93)
2. **Grooming Middle Managers**
   (Mar. 18, Page 93)
3. **Profit Sharing**
   (Apr. 15, Page 115)
4. **Inventory Management**
   (May 13, Page 109)
5. **Managing Our Markets**
   (June 17, Page 93)
6. **Research: Threshold to the Future**
   (July 15, Page 93)
7. **Producing for the New Technology**
   (Aug. 12, Page 113)
8. **Dealing with Workers**
   (Sept. 16, Page 119)

Extra personal copies of these Program for Management articles are available until the supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Dealing with Workers

AGGRESSIVE metalworking companies are getting more work from men and machines by abandoning the traditional group approach to industrial relations.

They feel a "personalized" program recognizes that the man entering the work force today is different from his predecessors in several respects:

1. He's better educated, has a higher standard of living, works fewer hours, has more leisure, wants more pay, wants (and needs) better supervision.

2. He's stepping into a rapidly changing technology that demands more skill, greater knowledge of his equipment and its role in the process, and the acceptance of more responsibility.

Two tall hurdles stand in the way:

1. The skilled labor shortage is here to stay for at least another eight years. Census figures indicate the workforce is growing only half as fast as the over-all population.

2. Management has surrendered many of its prerogatives of leadership to labor unions. They must be recaptured. (Take a look at your contract and compare its provisions with the checklist on Page 122.)

Industrial relations experts agree: You can get over both obstacles by doing the most with what you have. They advise:

1. Put more emphasis on training employees for the new jobs ahead.

2. Design your communications to reach the individual.

3. Learn how to motivate the individual to identify his interest with that of the company.

4. Get a labor contract that permits you to deal with the individual more effectively.

Wring Out Contract Costs

"Most managements," says E. F. Scoutten, vice president-personnel for Maytag Co., "are acutely

The employee's standards:

He's better educated . . .

Educational Levels

(% of population, 25 and over)

	Grade School	High School	College
1952	18.8	24.1	6.1
1950	20.2	20.2	6.0
1940	27.8	14.1	4.6

Works fewer hours . . .

Average Workweek

1965*	37 hr
Today	40 hr
1930s	44-45 hr
1920s	48-50 hr

*Estimated by STEEL.

aware of operating costs represented by direct wages and so-called fringe benefits. But how many can give realistic figures on the cost of labor turnover—hiring and recruiting, training, terminating, transferring, layoffs, and recalls?

"One company made a study of these costs and came up with these: Recruiting one worker, $5.48. Hiring him, $13.23. Orienting him, $1.56. Training, $238.40. Replacing tools damaged or destroyed, $41.19. Transferring from one classification to another, $94.14. Terminating, $3.77. Laying off, $1.21. Recalling, $1.30. Miscellaneous, $100. So, turnover costs come to over $500 per man. Multiply that by your turnover, and you'll have a rough estimate of what it's costing you."

Many of those factors are affected by your contract provisions on seniority. Your operational costs go up when seniority provisions permit excessive bumping (STEEL, July 8, p. 58). Maytag's seniority is built around job classifications and labor grades within a department. For example, one department may have seven labor grades and three job classifications in each grade. If a man in Grade 5 must be laid off, he can only bump downward in labor grades, and he can displace only the man in that grade with the least seniority. In practice, there can be only one bump per labor grade per man laid off.

Warning—Avoid "mutual agreement" and "union approval" clauses in your contract. Penalties for these clauses are time and money. Unions have already strapped some employers with provisions which deny the company from starting a new job until the union has agreed upon the job description and wage rate. It amounts to veto power over the installation of a new job.

The same is true in company-union committees affecting operations rightfully belonging to management. Here again, unions have forced their way into joint committees, setting labor standards and incentive rates. There is an obvious conflict of interest in this practice, and it results in wasted time before settlement is made.

Such activities are generally tied directly to competitive factors, and management must be able to make decisions and put them into action immediately. The union's position should be one of a watchdog—if an error is made or an employee is treated unfairly, corrective action should come through the grievance procedure.

Politics: Voting's Not Enough

Of prime concern to most thoughtful industrial relations executives is the union's growing political power. With all its shortcomings, collective bargaining is the most effective tool we have developed for settling differences between management and organized labor.

Warns John S. Bugas, vice president-industrial relations, Ford Motor Co.:

"Collective bargaining as we know the practice is not a preordained institution whose continued health and development will be automatic . . . Labor's objectives, to me, are quite clear and to be expected. One is to assure that the government will not serve as an effective brake or counterbalance to labor's forward drives; the second is to promote substantive objectives with respect to terms and conditions of employment through legislation rather than at the bargaining table . . . If labor achieves that political position, collective bargaining will become simply an interesting historical fact."

Many companies are no longer shying away from participation in politics.

They feel, like Fred A. Hartley Jr. (see Page 123), that participation is necessary if the proper balance of power between unions and management which labor law establishes is to be maintained.

On the rise . . .

Has higher standard of living . . .

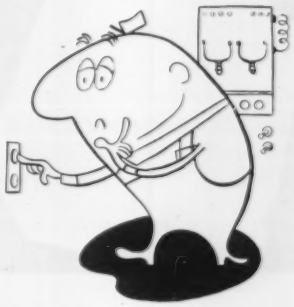
Average Hourly Earnings
(Metalworking)

1956	$2.15
1950	1.57
1947	1.35

Has greater job responsibility . . .

Average Investment & Net Property Per Hourly Employee (Ford Motor Co.)

1957	$13,200
1940	3,700



Check Their Gripes

You can debate the value of attitude surveys, but their popularity is increasing. Many industrial relations executives feel that they are at least a good starting point in designing an employee relations approach aimed at the individual.

Clark Equipment Co. did a survey following a strike at one of its plants. "We needed to know more about what the individual employee felt about us," says Bert Walter, vice president-industrial relations.

The survey showed that basic atttitudes toward the company and the individual's job were fairly consistent throughout all plants—including the one which had just settled the strike. The differences between plants showed up in the major gripes and suggestions the employees made (see Page 125).

For example, in the plant which had the strike, the top three complaints were for more co-operation between union and management, re-evalution of time study and incentive systems, improvement of the supervisory staff. At another plant, better housekeeping, better communications, better planning and scheduling of operations were the top items. At a third, the major complaints were against unpaved and unlighted parking lots, lack of coffee vending machines, and lack of good ventilation. At only two of the seven plants were supervision and pay or incentives among the top complaint areas.

The survey highlighted specific areas which needed attention in each plant—many of them rather easily corrected. Clark officials reviewed results with plant managers and asked that corrective action be taken within three months if possible.

Give Them Better Bosses

One of the keys to the degree of success you'll have in aiming at the individual rests with your foremen. They're on the firing line with day-to-day contact with employees. They administer your labor contract; they are the basic communications link between you and the employee; they have a key role in motivating the individual. In short, to most employees, the foreman or supervisor is the company.

Because higher caliber men are coming into your plant, the management ability of your foremen becomes more important than ever before.

The selection of foremen has been pretty subjective—he's a conscientious worker, gets along well with fellow employees, knows his job well, has good personal habits. Needed is more objective emphasis on the candidate's basic mental ability and his basic psychological interests in managing people.

Many companies like International Harvester Co. are turning to formal testing and screening procedures to select potential foremen. Candidates enter training programs designed to develop leadership characteristics and to teach the technical facets of the position. To eliminate hasty appointments, candidates are placed in foremen pools from which vacancies are filled as they occur.

Profile of a Good Foreman—Company studies made by George A. Fry & Associates, Chicago, indicate that the average foreman selected on a purely subjective basis ranks in the 25th to 35th percentile in mental ability. The consulting firm has found that successful foremen should rank at least in the 50th percentile.

Another trait of the successful foreman is a basic interest in people. Studies by the University of Michigan's Institute for Social Research show that foremen having high productivity records are "employee centered" as opposed to "production centered." Such foremen view their jobs in terms of human problems rather than rules, procedures, and the mechanics of

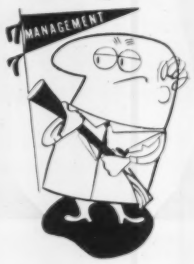
Guard your management rights and flexibility . . .

Does your labor contract include these provisions?

- Management has right to introduce new or improved methods or facilities, to alter or discontinue any operation.
- Selection and assignment of supervisors are the sole responsibilities of the company and not subject to grievance.
- The company has the sole right to determine the extent and schedule of operations.
- The union agrees not to oppose the introduction or operation of new equipment in processes or production methods.
- Management has the right to establish a new job or change a job's content and rate classification without prior union approval. Decisions may be challenged through normal grievance procedure.

Does it avoid these?

- Mutual company-union agreement clauses.
- Joint union-management committees.
- "Union approval" required provisions.



meeting production goals:

1. They emphasize training employees to do present jobs well and to prepare them for the next highest job. 2. They show more interest in the employee's problems, both on and off the job. 3. They are more understanding and less punitive when mistakes are made.

Mental ability, personality traits, and basic psychological interests can be measured if competent psychologists do the testing. Regardless of how good your training program is, the individual will not develop into a good foreman if he does no have mental ability and interest in people.

Make Him Want To Do It

The areas which require the most emphasis in mapping out a program are motivation and communications. They are basic, and the results are measured directly on the profit and loss statement.

As you shift toward more automation and technological improvement, the individual and his initiative, his co-operation, and acceptance of responsibilty become increasingly important to you. It may be true that nobody will be needed to tend the machine in operation and that the handling and feeding of materials will be automatic. But how well that machine performs and how much you get out of it will depend upon the employee who sets it up, maintains it, and directs it.

The high caliber employee poses the challenge: How do we give him job satisfaction? How do we stimulate and motivate him to superior performance?

Good pay and security will continue to rank among the top basic needs of the employee. But he'll be placing more emphasis on pride of work, on being recognized as an individual, on opportunities for growth and advancement.

Take a look at—and a tip from—the problems within labor unions. The unrest of the skilled worker stems primarily from the union's neglect to recognize him as being something "special." Efforts to organize whitecollar workers can't get off the ground because these people fear they'll lose their identity as a "special" class.

Personalizing Profits

The big reason profit sharing has been so successful is that each individual can directly identify himself with the company. From the company's standpoint, profit sharing provides an effective channel of communications because every facet of its operation can be tied to the program.

Motorola Inc., Chicago, provides one of the best examples of good motivation and communication through profit sharing. Employees who started with the program ten years ago and contributed the maxium $200 per year, now have a book value of $10,697 each. Last year, the company's contribution amounted to 21 cents per hour per employee who made the maximum contribution. That didn't include any interest or dividends that the fund earned.

"When an individual has a personal stake of those proportions in working for you," says Kenneth Piper, director of human relations, "it means something to him when you talk about how increased costs cut profits."

Motorola ties scrap drives, safety, cost reduction, new installations, suggestions, and all such programs to profit sharing programs. Its communications system was put to a real test this year. The book value of its profit sharing fund shrank in 1956 because of market variations. On maximum individual accounts the value dropped $800; with the company's contribution of $1000, the individual's account went up only $200.

Another Tip—A growing criticism of today's typical house organ is that the employee is getting weary of the "economic lesson" of

the month. Here Motorola had a natural: A basic lesson in free enterprise economics that had meaningful personal interest to every employee.

"We met the problem head on," says Mr. Piper. "We didn't attempt to ignore it or gloss over it. We got one of Chicago's top investment counselors to write an article on what happened not only to all securities in 1956 but to those related specifically to the profit sharing fund. Employee reaction was excellent."

Motorola also feels that the employee newspaper is a basic communications tool to be aimed at the individual. The *Voice of Motorola* is edited by a paid editor who co-ordinates the activity. Emphasis is on the employee's operation of the paper, with as little direction from management as possible. Reporters belong to a press club which meets regularly. An annual readership study is made to determine what the employees want to read. If a standard item doesn't get a 90 per cent vote of

Fred Hartley: Sound labor law helps . . .

Power Balance in Bargaining

Thoughtful industrial relations executives are concerned about labor's growing economic and political strength. Collective bargaining—the most effective tool we have developed for resolving problems between organized labor and management—faces these threats to its survival:

1. Labor or management could gain enough economic power to reduce collective bargaining to dictation.

2. Either side could gain enough political power to supplant collective bargaining with government regulation.

Labor law is basic to maintaining the balance of power. STEEL interviewed Fred A. Hartley Jr., co-author of the Taft-Hartley Act, for his observations on the situation today. Now a consultant in Washington, the former New Jersey congressman is pressing for changes in T-H. Mr. Hartley emphasized:

1. Management has been derelict in exercising its rights to communicate with employees. That right, denied under the Wagner Act, was restored under Taft-Hartley. Too many firms wait for a crisis before talking to their employees.

2. Management—and all business—must assume a bigger role in politics. Industry and business lost the last election—labor has 152 subservient members in the House of Representatives, and it has packed the labor committee.

Here are Taft-Hartley improvements Mr. Hartley thinks you should be seeking:

Secondary Boycotts—T-H provisions covering them need to be strengthened to make any such action illegal—whether it is directed at employees, employers, or government bodies.

Picketing — The Kohler Co., Southern Bell Telephone Co., Perfect Circle Corp., and Westinghouse Electric Corp. incidents point up the need here. When a picket line becomes an instrument for intimidation and violence, it should be outlawed. Let's define peaceful picketing. Let's limit picketing to company employees and prohibit goon or "educator" squads.

NLRB Jurisdiction—Small businesses and those not engaged in interstate commerce are not getting adequate protection. States should be given more rights to deal with labor problems, of the NLRB's jurisdiction should be extended.

Antitrust Laws—The economic strength of unions, particularly against smaller companies, has shown the need for placing unions under the same monopoly restrictions as business.

Right - To - Work Laws — Employees should have the right—but they should not be compelled—to join labor organizations. Compulsory unionism is giving the unions a monopoly over the nation's employment. State right-to-work laws—18 states have them—are a step in the right direction. But an amendment to T-H, such as the exemption of the Railway Labor Act, could make them meaningless. What's needed is a right-to-work provision in Taft-Hartley, or an amendment to the Constitution.

These programs are good because they . . .

Aim Motivation at the Individual

Suggestion Systems—

1. Set up a formal administration system so that all suggestions are processed promptly.
2. Size of awards should be commensurate with the value of the suggestion.
3. All suggestions, whether usable or not, should be acknowledged. Individuals whose suggestions are adopted should be given recognition.

Profit Sharing Plans—

1. Be sure your program permits sufficient "profits" for the individual to stimulate his active support.
2. Promote the program continuously by tying in profits to such things as safety, scrap reduction, and improvement suggestions.

approval, it is dropped.

In making sure the paper appeals to the individual, certain things are taboo: Presidential editorials and regular handouts, product sales pitches, news about sales conventions, the reproduction of speeches given by company brass. The goal is to get news and pictures into the newspaper about as many employees as possible—what they're doing and what they're interested in. The newspaper is a company's best medium for giving the individual personal recognition.

I'm a 'Company Man'

A good suggestion system helps to put emphasis on the individual. Too many firms consider suggestion plans as a business proposition—you pay out a certain percentage of annual savings that the idea produces; you're buying something. If the program is set up properly and promoted well, its greatest value is in communications.

When an employee submits a suggestion for which he knows the company will benefit more than he does personally, he's identifying himself with the company. You must create the climate to get an employee to search actively for ways to improve your operations.

A. O. Smith Corp., Milwaukee, has had a "satisfied customer" program running since 1954. Its theme is: The satisfied customer keeps the firm in business and keeps the employee working. The first year the program stressed the need to be competitive with other producers' goods in quality, cost, and dependability. When employees were asked for suggestions to improve quality, one plant averaged two ideas per employee.

Last year, the program aimed at employees "re-searching their jobs" for ways to improve quality and cut costs. To stimulate employee thinking, a slide film was prepared by the training department to show employees how to study their jobs and which areas might be most productive of good ideas. Result: In 1956, employees submitted more than 1600 ideas; almost 500 were adopted; awards totaled $23,600.

One of A. O. Smith's ideas that may help your company is the establishment of a suggestion plan "Hall of Fame." Pictures of each individual who has received $500 or more for an idea he submitted are displayed in the plant's lobby.

Devise New Incentives

If you're relying primarily on the piecework type of incentive plan, it'll pay you to begin thinking about some kind of replacement.

Like most incentive systems, A. O. Smith's base rate reflects what the average worker can produce. With the narrowing of the wage gap between skilled and semi-skilled workers, some skilled men are finding their pay checks smaller than their less skilled fellow employees. Reason: On much of the new equipment and automated installations, the machine controls most of the work cycle. On most piecework jobs involving older equipment, the man controls most of the work cycle and with extra effort can earn more money.

It leads to this situation when

seniority provisions permit bidding for jobs: Senior and more skilled workmen are taking the piecerate jobs to fatten pay envelopes even though they don't use their skill to best advantage and must work harder. This leaves the skilled work to the younger, less experienced employees—boosting the cost of training, scrap, and machine downtime. Poor morale is a side effect.

The skilled labor shortage is focusing attention on the need for more emphasis on training programs. Fortunately, properly established training programs provide one of the best opportunities to aim your employee relations program at the individual—and you can reach so many this way. For example, nearly half of Inland Steel Co.'s 18,500 employees are in some sort of training.

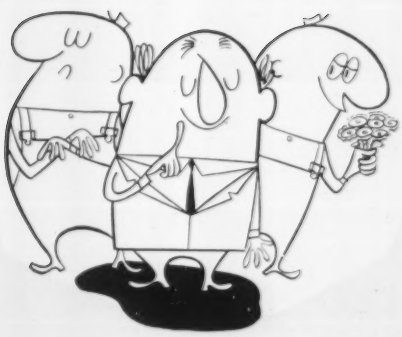
Make on-the-job training the responsibility of the foreman or immediate supervisor. It provides another avenue for the foreman to communicate with the employee on something other than a "let's get out the work" basis. To the individual, it's a constant reminder that the foreman and the company are interested in helping him get ahead.

Many companies that have relied upon the traditional "understudy" type of training for skilled jobs have found themselves short of capable men during periods of expansion. To correct this situation, they're turning to more organized programs designed to speed up the individual's total exposure to all facets of the job. The era of haphazard exposure, "taking 20 years to learn the job like my father and I did," is past.

If you're in an industry in which radical technological changes are taking place, on-the-job training will not meet your needs for the higher level jobs created—machine operators will become skilled maintenance people, understanding both the machine and its role in the process; clerks will become programmers for electronic data processing equipment.

Train for Tomorrow's Jobs

One approach to the problem is that of Inland Steel Co. (see Page 126). All employees are eligible.



An attitude survey will help you find out . . .

What Do Employees Think of You?

Following a strike at one of its plants, Clark Equipment Co. decided to do an attitude survey. With a 23 per cent return from its nearly 15,000 employees, it found:

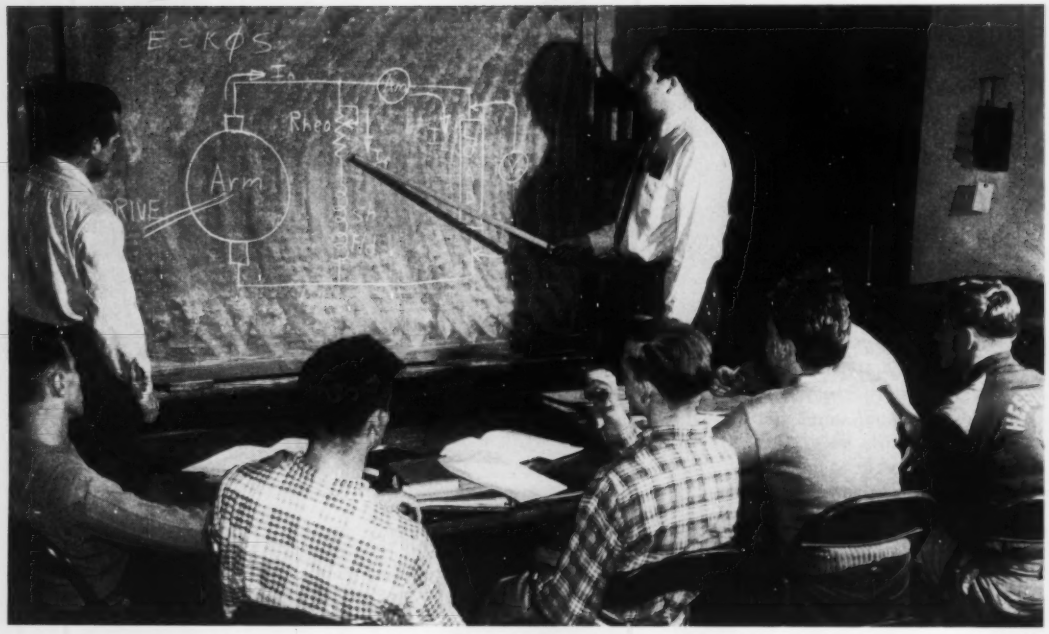
89.7 per cent thought the company was definitely a good place to work, compared with 1.9 per cent who had no comment or said no.

74.7 per cent were definitely satisfied with their jobs; 4.3 per cent were looking for advancement; 1.3 per cent were definitely dissatisfied.

But the real value of the survey came from employee's major gripes and suggestions. No checklist was provided—complaints and suggestions were the individual's own ideas and opinions. "At each plant, emphasis differed," says Bert Walter, vice president-industrial relations, "and we got a sharp picture of areas which needed our attention. We set up programs in each plant which were tailored to the comments of the employees."

Here are the areas employees commented about most:

- Need better co-operation between union and company, among foremen, departments, and shifts.
- Need attention to time study and incentives—adjust rates, eliminate incentives or give to all, set up bonus system.
- Need workable check-out system for tools and gages.
- Lax and poor supervision—need tact and diplomacy; too much favoritism, lack of job knowhow.
- Improve communications—among management and employees, among shifts and departments, tell more about proposed changes in company and departments.
- Need better housekeeping.
- Need better planning, systems, and organization.
- Air condition offices.
- More pay, equalize pay of men and women.
- Set up suggestion system.



Training: Aim at Future Jobs . . .

Automation and our rapid technological advances are creating new types of jobs which demand more knowledge, more skill, more responsibility. On-the-job training meets today's job requirements. More emphasis is needed in preparing employees for tomorrow's jobs.

Inland Steel Co. has approached the problem by developing a training program at Purdue University for its employees. Its basic objectives: Give employees a broader educational background which will help them understand the activities in a steel mill and make their transition to new type jobs easier.

Courses cover mechanics, steelmaking, and electricity. Each takes two years requiring 3 hours in class two nights a week for 33 weeks each year. The curriculum includes basic principles of mathematics, chemistry, physics, and other sciences as they pertain to steel mill operations.

About 425 students have been graduated since the course started in 1948. Experience indicates that better than half the students later earn promotions in their jobs. One employee, a motor inspector, has completed all three courses.

to take the Inland-Purdue training program. Not all applicants will have the background or ability to complete the course. To discourage the impossible, the orientation and placement program is designed to let employees drop out on their own initiative rather than placing the burden on the company of having to tell the individual he can't take the course.

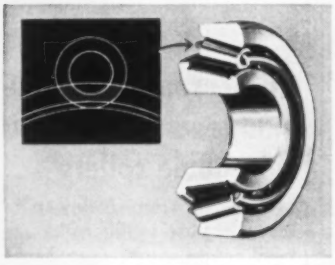
The course is offered without promise of promotion—although better than 50 per cent of the graduates eventually move up. The basic objective is to give employees an educational background in steel mill operations and procedures. With this, they should be better able to learn and adapt to any new job that radical technological changes create.

Compare the composition of your present labor force with what it was in the immediate postwar years. You'll find proportionately more of today's employees are in the semiskilled and skilled classifications and fewer in the common laborer grades. Also check your plant and equipment investment per employee during the same period.

Both comparisons will emphasize the increasing importance of the individual to your operations. How well your productive machine operates depends upon how well you train, integrate, and motivate him to superior performance.

You can do it best by treating him as an individual.

Tomorrow's "dream" is our job today!



HIGHER FLANGE IMPROVES ROLLER ALIGNMENT

As shown by the gray area above, the higher flange provides a large two-zone contact area for the roller heads. This greatly reduces wear—practically eliminates "end play". Larger oil groove provides positive lubrication.

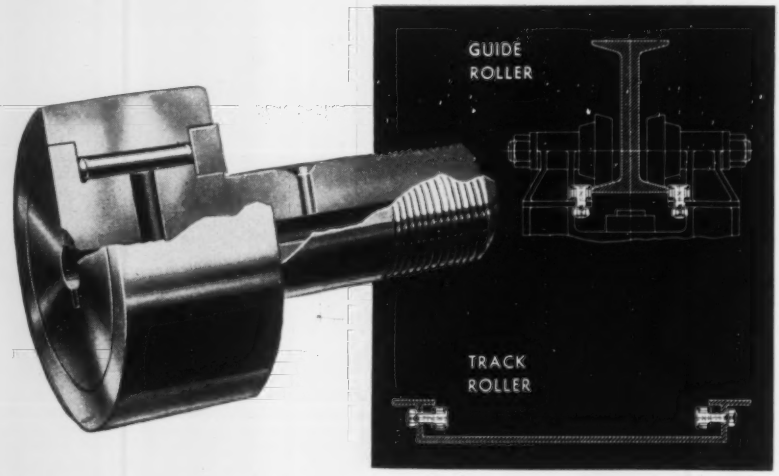
There's more to the car of tomorrow than just futuristic styling! Automotive engineers are working to perfect completely new power plants—like turbine engines—to achieve yet-unheard-of performance and economy! And they demand bearings that are as advanced as their thinking. This is no new challenge to Bower engineers. A glance at the design features listed at left will tell you a few of the many original Bower contributions to bearing performance which have reduced bearing maintenance and failure to a practical minimum. There are many more in the making. If your product is one which needs advanced bearings *today* plus realistic planning for the future, specify Bower. There's a complete line of tapered, straight and journal roller bearings for every field of transportation and industry.

BOWER ROLLER BEARING DIVISION
FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 14, MICHIGAN

BOWER ROLLER BEARINGS

BEARING TIPS by McGill

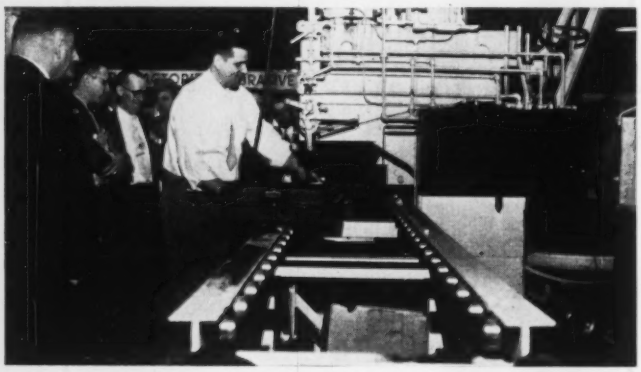
Let a CAMROL bearing be your guide



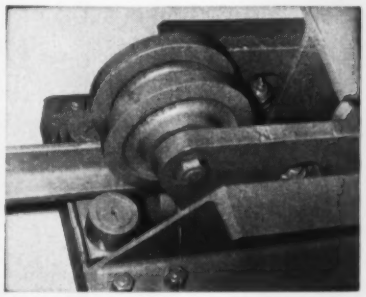
Obtain freer rolling, improved alignment and positive side thrust

In guide and support roller applications CAMROL Cam Followers insure free rolling action and positive side thrust while eliminating the wear of more costly flanged wheels. Then, too, they provide improved alignment and low starting and running friction with high unit load and shock capacity, especially at low speeds as track rollers. Lubrication is simplified and maintenance can be reduced to a minimum in these applications. Specify the interchangeable sealed SGR series for added protection against contamination.

CAMROL CF bearings provide friction-free track rollers for automatic mold blower



McGill CAMROL CF rollers are used as guide rollers to form a mold conveyor in the Beardsley & Piper MBS-20 Mold Blower. The machine blows and squeezes cope or drag in a single automatic operation, handling up to 4 molds per minute. The CAMROL CF bearings replaced less efficient friction rollers in this application. Although, the duty here is rather light and speeds slow, the cam follower bearing provides lesser starting and running friction. This helps speed the flow of work from the machine, which must be fast and automatic. The integral stud feature eases assembly and its standard design simplifies procurement.



CF bearings minimize maintenance as crane side guide rollers

McGill CF cam follower bearings serve as side guide rollers in overhead cranes manufactured by Louden Machinery Company of Fairfield, Iowa. Freedom from maintenance, a time saver because of the inaccessibility of the bearing when the crane is in operation, is an important advantage of the cam follower bearing.

Send for Catalog No. 52-A

Insure performance with McGILL®

MULTIROL® GUIDEROL® CAMROL
Precision Needle Bearings

McGILL MANUFACTURING COMPANY, INC., 301 N. LAFAYETTE ST., VALPARAISO, INDIANA

STEEL
September 16, 1957

Technical Outlook

TITANIUM ALLOYS— Two new ones are announced by Mallory-Sharon Titanium Corp., Niles, Ohio. MST 2.5Al-16V (2.5 per cent aluminum, 16 vanadium) is produced as sheets which can be readily formed, then heat treated to give a yield strength of 150,000 psi. MST-821 (8 per cent aluminum, 2 columbium, 1 tantalum) is a weldable sheet and bar material with good high temperature strength. In the 400 to 1000° F range, it is said to have a 200° F strength advantage over the fully weldable 5Al-2.5Sn alloy.

TIGHTER BEARING SEALS— Hoover Ball & Bearing Co., Ann Arbor, Mich., reports it's using Teflon for contact seals of ball bearings. It's chemically inert, tough, withstands high temperatures, and has a low coefficient of friction. The material also is said to improve lubricant retention.

TOOL CHECKERS— How can you ferret out a broken tool before it does any damage? The problem is becoming increasingly important to builders and users of automatic machines that run too fast for unaided observation. M. V. Hayes, Jones & Lamson Machine Co., cites two possibilities: On turret-type machines, use "cat whiskers" around the turret backs that touch good tools but not defective ones; use a microphone to detect unusual vibration (common to tool malperformance) and stop the machine.

ELECTRICITY FROM GASES— The direct conversion of the chemical energy of gases into electricity has been accomplished by researchers at National Carbon Co., Parma, Ohio, a division of Union Carbide Corp. It's done in a fuel cell which contains catalyzed carbon electrodes (they're hollow and porous) through which oxygen and hydrogen flow. An electrochemical reaction is developed when the gases diffuse through the electrodes and contact a solution of potassium hydroxide which is used as electrolyte. The fuel cell is ideal for high current, low voltage use. First application: Power for a U. S. Army Signal Corps mobile radar set.

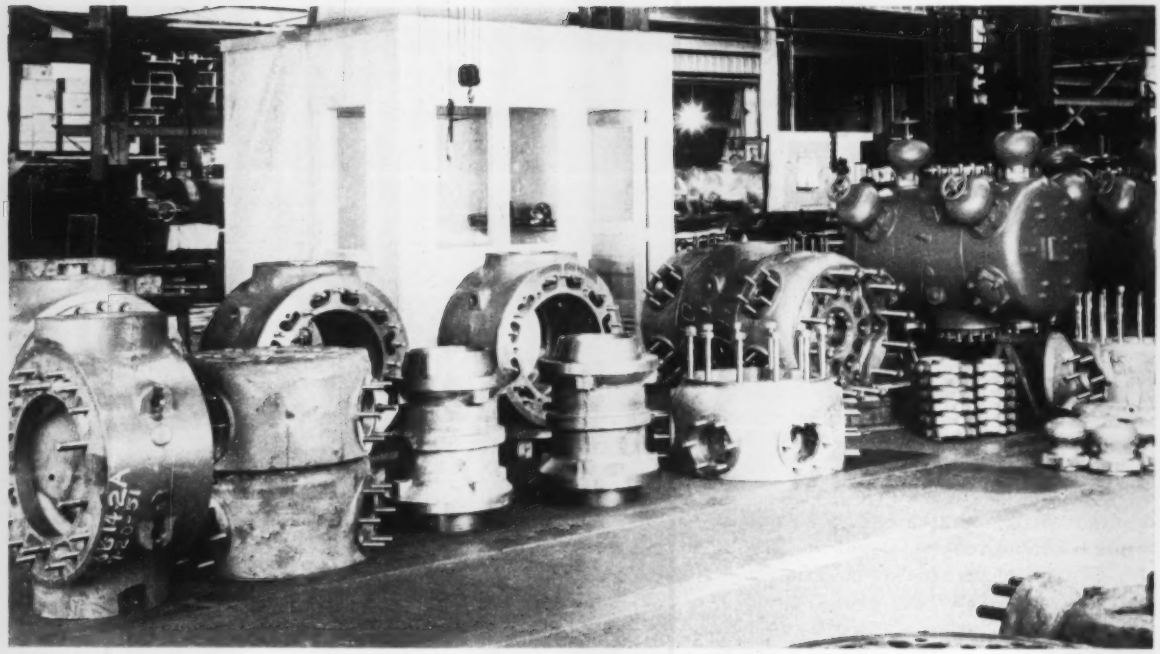
BETTER STRIP— An ultrathin strip made of copper clad with silver is said to offer improved electrical conductivity and increased resistance to atmospheric corrosion and oxidation at high temperatures. Produced by American Silver Co., Flushing, N. Y., it is used in miniature, high temperature coils, high frequency conductors, connectors, tabs on step switches, and radar cable braiding.

NEAT FINISH—Precision cutting heads for Schick shavers are cleaned and polished on two wheels which combine cloth and tampico. The alternated brush and impregnated cloth construction cuts friction heat and part damage, says Hanson-Van Winkle-Munning Co., Matawan, N. J.

KEEN MEMORY— IBM has developed a "memory" device for high speed, high capacity electronic computers that responds in a hundred millionth of a second. The unit uses a miniature printed circuit of lead at temperatures close to absolute zero. It needs only a third of the current required to drive ferrite memory units and responds about a hundred times faster.

BUMPER CROP— The operation line-up at Ford's Monroe, Mich., bumper plant goes like this: 1. Draw. 2. Rough trim. 3. Restrike and cup. 4. Separate two connected bumpers. 5. Finish trim. No. 2 and 3 will be done by four Hamilton presses, valued at $1 million. They are 1500 ton, single action, underdrive units with 60 x 156-in. beds.

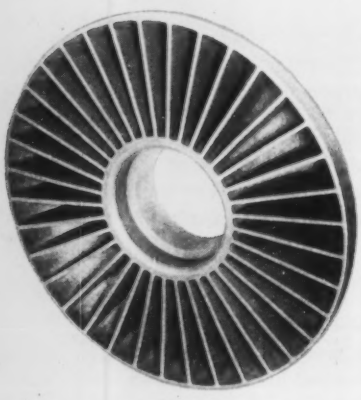
Metalworking Outlook—p. 73 Market Outlook—p. 191

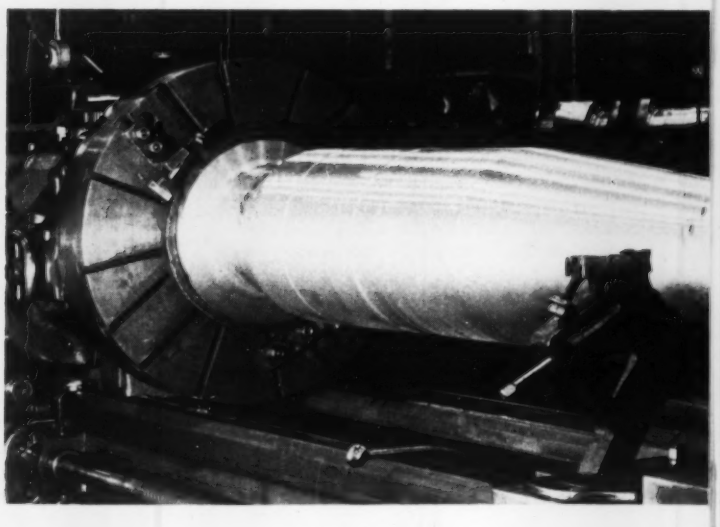


COMPRESSOR PARTS—Ductile iron doubled the pressures at which compressors for natural gas lines could operate. Complex gas passages and water jackets did not present difficult casting problems

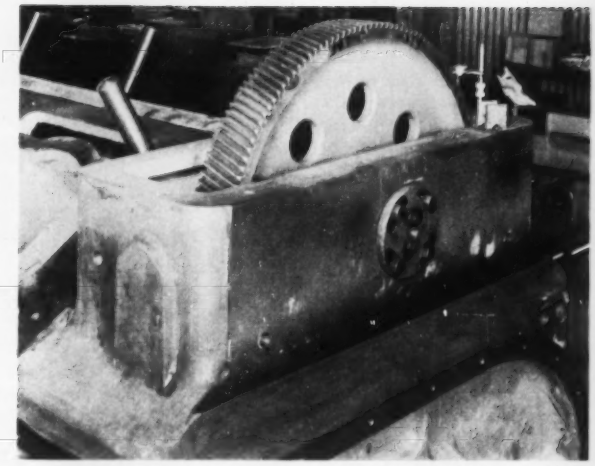
DUCTILE IRON:

Why It is Popular





HYDRAULIC COUPLING—350 hp are transmitted from the gear train on an engine to a mechanical supercharger by this coupling which is 13 in. in diameter. Cast in shell molds, the ductile iron vanes are less than 1/8 in. thick



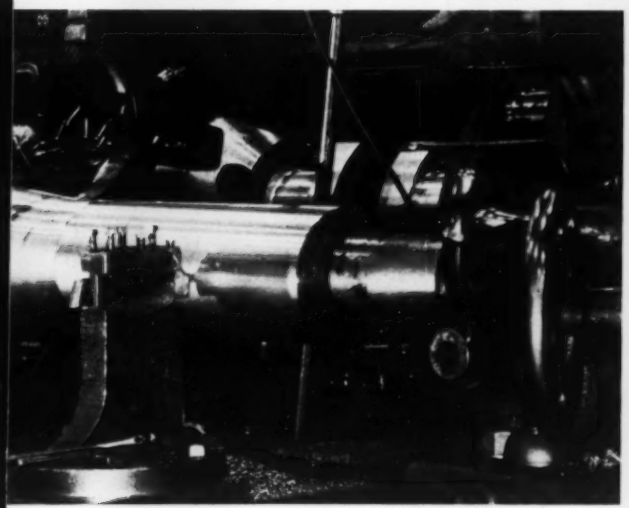
GEARS—Air quenching the gear blank gives the 250 to 275 Brinell required in the gear teeth. Ductile iron gears stand up under a pulsating load, resist wear, do not pit, and run quietly

THESE ILLUSTRATIONS show how the advantages of ductile iron have been applied by Cooper-Bessemer Corp., Mt. Vernon, Ohio.

The material's acceptance is based on: 1. Strength and toughness. 2. Castability. 3. Heat treatability. 4. Vibration damping capacity. 5. Good high-temperature durability (low growth, resistance to scaling, weldability). 6. Corrosion resistance. 7. Economy.

Prediction—C. William Gilchrist, foundry superintendent of Cooper-Bessemer, says potential uses may make ductile second only to gray iron as a casting material.

CRANKSHAFT—This 80-60-03 ductile iron casting weighs 3500 lb. Savings are estimated at 50 per cent



SHAFTS—Extension shafts for an engine-driven generator weigh 2000 to 5000 lb. Ductile iron savings are estimated at 55 per cent

DIESEL BLOCK—The Navy has accepted the material for use aboard fighting ships. This engine block is made of 60-45-10 ductile and weighs 7000 lb

Tempering Data and Curve for Casting No. 3

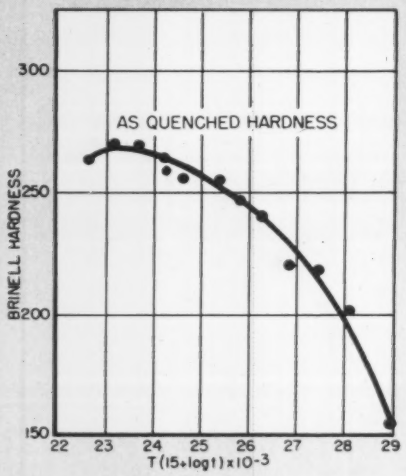


Fig. 1

Sample	Temperature °F	Time, Hours	Bhn
As-quenched			263
3-1	1050	1	282
3-2	1050	2	268
3-3	1050	10	265
3-4	1150	½	269
3-5	1150	1	261
3-6	1150	2	257
3-7	1150	5	255
3-8	1150	20	241
3-9	1250	1	249
3-10	1250	5	220
3-11	1250	10	218
3-12	1250	24	201
3-13	1250	90	156

DUCTILE IRON:
How Heat Treatment Upgrades It

HEAT TREATMENT may be able to save heats of 90-65-02 and 80-60-05 ductile iron which do not meet specifications as cast. The conclusion is drawn from tests made at General Electric Co.'s Materials & Processes Laboratory on a 60-40-15 ductile iron in the as-cast, annealed, normalized and tempered, and oil quenched and tempered states.

Procedure—Cast blocks, 5 x 7½ x 12 in., were cast as part of an 8000-lb heat. The blocks were well risered over a 5 x 12 in. face. Ladle analysis: Total carbon 3.15, silicon 2.79, manganese 0.22, magnesium 0.072, phosphorus 0.022, sulfur 0.008 per cent.

The first casting was tested in the as-cast condition. Casting No. 2 was annealed at 1650° F for 6 hours, furnace cooled to 1325° F, held for 12 hours, then furnace cooled.

By R. S. ZENO and C. D. WALKER

Large Steam Turbine-Generator Dept., General Electric Co., Schenectady, N. Y.

The third casting was normalized at 1600° F, then air cooled and tempered, using the curve (Fig. 1) to Brinell hardnesses of 239 and 196.

The fourth casting was austenitized at 1550° F for 6 hours, oil quenched and tempered, using the curve (Fig. 2) to Brinell readings of 269 and 232.

After casting No. 4 was heat treated and tested, a block 2½ x 7½ x 12 in. remained. It was reaustenitized at 1550° F for 6 hours, oil quenched and tempered, using the curve (Fig. 3) to 298 Brinell.

Tempering—Several 1-in. cubes were cut from casting No. 3 when it was in the normalized condition and from castings No. 4 and 4A as oil quenched. The cubes were tempered and their hardness measured. Times and temperatures for each cube are shown with Fig. 1, 2, and 3.

The hardness is a function of both temperature and time. The parameter of time and temperature can be calculated from the equation:

$$M = T\,(C + Log\ t)$$

where

M = *the tempering parameter*

T = *temperature in °R or* $4/9\ (°F - 32)$

C = 15, *the material constant*

t = *time, in hours*

The parameter is not valid if tempering temperatures are above the lower critical (A_1) line.

Metallurgy—The unetched microstructures of the as-cast and heat treated castings were about the same. Much of the graphite was not truly spheroidal and might

Tempering Data and Curve for Casting No. 4

Sample	Temperature °F	Time, Hours	T (15 + Log t)	Bhn
As-quenched				274
4-1	1050	1	22,700	269
4-2	1150	½	23,700	256
4-3	1150	2	24,600	253
4-4	1150	5	25,300	243
4-5	1150	20	26,200	226
4-6	1250	1	25,700	245
4-7	1250	5	26,800	216
4-8	1250	7	27,100	223
4-9	1250	10	27,400	206
4-10	1250	16	27,700	197
4-11	1250	24	28,000	159
4-12	1250	90	29,000	156

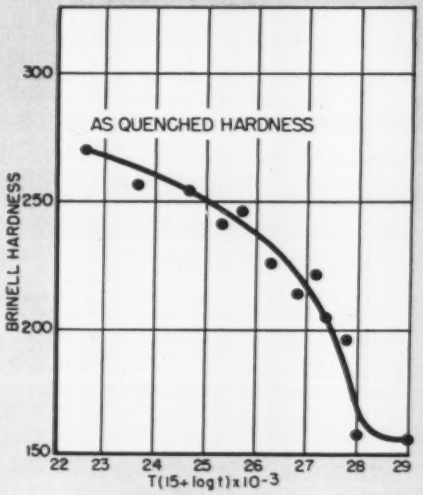


Fig. 2

better be classified as "crab" graphite. While this condition is not necessarily harmful to mechanical properties, there was a sizable number of nitride inclusions mixed with minute graphite particles in clusters or stringers—which are harmful to tensile ductility. Porosity and shrinkage voids were practically nonexistent.

Microstructures of the castings consisted of varying amounts of ferrite, pearlite, and nodular graphite. The cooling rates of the oil quenched parts were not fast enough to produce martensite.

The normalized material had more pearlite than the oil quenched samples. The higher austenitizing temperature apparently raised hardenability above that of oil

Tempering Data and Curve for Casting No. 4A

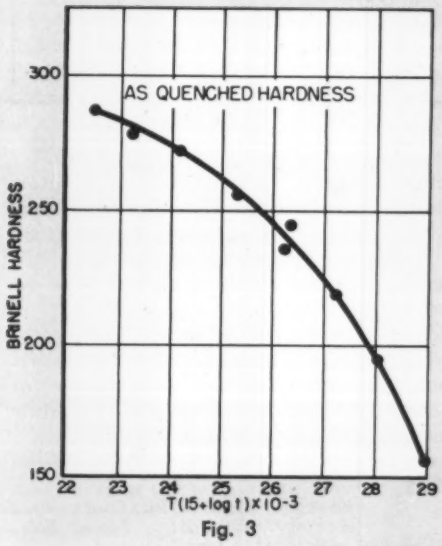


Fig. 3

Sample	Temperature °F	Time, Hours	T (15 + Log t)	Bhn
As-quenched				297
4A-1	1050	1	22,700	287
4A-2	1050	3	23,400	280
4A-3	1150	1	24,200	274
4A-4	1150	5	25,300	258
4A-5	1150	20	26,200	245
4A-6	1200	6	26,200	239
4A-7	1250	7	27,100	223
4A-8	1250	24	28,000	198
4A-9	1250	90	29,000	156

Tensile and Hardness Properties

Casting	Condition	Bhn*	Tensile Strength, psi	Yield Strength 0.2% Offset, psi	Elongation in 2 in. %	Reduction in Area %
1	As-Cast	239	84,000†	67,000	3.5	1.9
			85,500	66,000	2.5	2.5
			80,700†	63,000	2.0	2.0
2	Annealed	150	61,800	44,500	14.0	13.0
			61,200	43,500	16.0	13.0
			62,900	44,000	18.5	17.7
3	Normalized	263				
3	Normalized & Tempered	196	90,800	65,500	6.5	4.3
			91,000	64,500	7.5	5.8
			88,900	62,000	8.0	5.0
3	Normalized & Tempered	239	99,000	69,000	5.0	3.1
			102,400	72,000	6.0	4.3
			101,000	74,500	5.0	3.9
4	Oil Quenched (First Quench)	274				
4	Oil Quenched & Tempered	232	86,100‡	68,000	3.0	2.3
			103,900†	66,500	9.0	7.7
			101,000	68,500	7.0	6.6
4	Oil Quenched & Tempered	269	117,800	79,000	5.0	5.0
			106,800†	78,000	3.0	2.7
			112,600†	76,500	4.5	3.9
4A	Oil Quenched (Second Quench)	297				
4A	Oil Quenched & Tempered	298	137,500†	97,500	6.0	3.9
			127,000	87,500	5.0	3.5
			121,250†	97,000	4.5	3.1

*Average of six readings. †Small slag inclusion. ‡Large slag inclusion.

quenched material by producing large austenitic grains and increasing the quantity of carbon in solution at the austenitizing temperature.

Casting 4A contained more pearlite than No. 4. The smaller section enabled 4A to cool more rapidly from the austenitizing temperature. Tempering caused pearlite structures to spheroidize.

The prolonged hold slightly above the lower critical line should have caused casting No. 2 to have a structure of ferrite and graphite. However, there was a small amount of pearlite present, perhaps due to incomplete austenitizing.

Mechanical Properties — Tensile strengths of treated castings are listed in the table. Elongations were on the low side, probably because of the amount of inclusions and the presence of crab graphite.

Heat treatment alone enabled the 60-40-15 grade of ductile iron to meet 90-65-02 and 80-60-05 specifications.

At the same hardness level, heat treated ductile iron has a better combination of strength and ductility than as-cast material. Compare castings 1, 3, and 4.

V-notch Charpy curves were determined. They are similar in shape to those of steel but are at much lower energy levels. Impact energy absorbed was greater for ferritic (annealed) than pearlitic (normalized) ductile iron.

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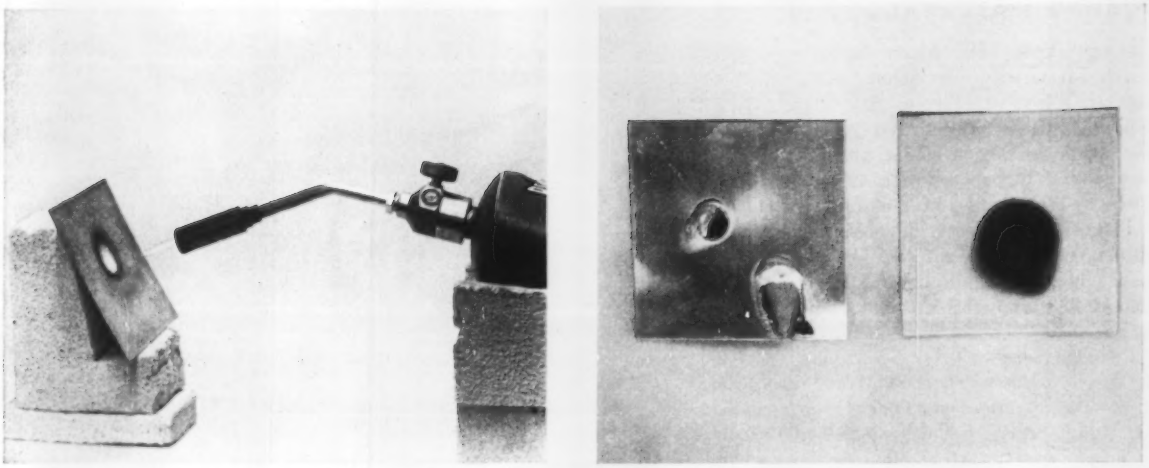


Coated aluminum (left) resists 1800° F. It burns holes in untreated sample (right)

Coating Beats Heat

New ceramic insulates aluminum and prevents melting at 1800° F. Immediate uses: Supersonic missiles and aircraft. It also works on aluminized steel

By DR. PAUL A. HUPPERT
Director, Ceramic Coating Dept.
Gulton Industries Inc.
Metuchen, N. J.

A NEW ceramic coating 0.0015 in. thick protects aluminum and its alloys from temperatures up to 1800° F.

That's hot enough to melt a hole in an unprotected sheet in as little as 30 seconds. (Aluminum and its alloys melt between 1250 and 1350° F.)

The coating also protects steels aluminized by hot dip or spray. Performance is similar to that of stainless steels. Cost is much less.

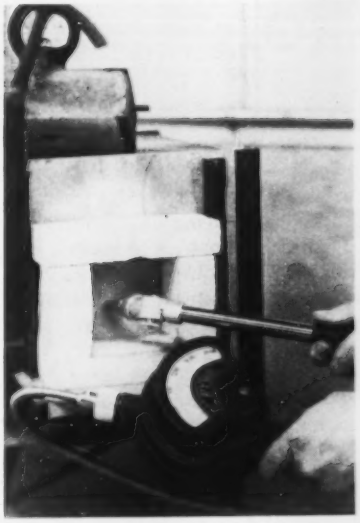
Significance — Such protective devices are good news to plane and missile makers. Speeds up to 2000 mph develop temperatures as high as 700° F, limiting aluminum's usefulness. By coating both sides of the metal, you can develop a kind of rigid sandwich, using rather thin gages of aluminum to whip weight and volume problems. Parts coated on one side have lower heat resistance.

Composition—Made and developed by Gulton Industries, the coatings have these components:

1. A low-melting glass. (Either commercial types or a high lithia, frit type for low melting alloys.
2. Refractory additives. (Titania, zirconia, magnesia, silica.)
3. Fluxing agents. (Lithium compounds are preferred.)

The coatings have a high degree of adherence to the base metal. They withstand impact shock, flame impingement, thermal shock, and endurance tests. They add practically no weight or volume to a coated part.

Here are some of the alloys which work successfully with the



Window of electric furnace is a coated sheet of aluminum. Metal starts to soften around 1550° F; coating remains intact

Coated samples pass standard bend test for adherence. Other tests: Falling weight and accelerated spalling

COATING BEATS HEAT . . .

coating: 24S, 75S, Alcoa X2219, North American Aviation 42B, regular alloys of Group 6 (61S, 63S), Armco's aluminized steel, low and high carbon steels, and alloys which have been aluminized.

Heat Treatment—A portion of the development work covered the influence of heat solution treatment on the tensile strength of coated 24S and 75S alloys. Combining heat treatment and firing of the coating shows promise, thanks to the fluxing action of lithium compounds. They widen the time and temperature ranges for firing. It is also possible to follow firing by a water quench prescribed by some manufacturers.

Preliminary results show a loss of less than 12 per cent in ultimate tensile strength from firing the coatings. Additional heat treatment controls applied during or after the firing will probably reduce that figure.

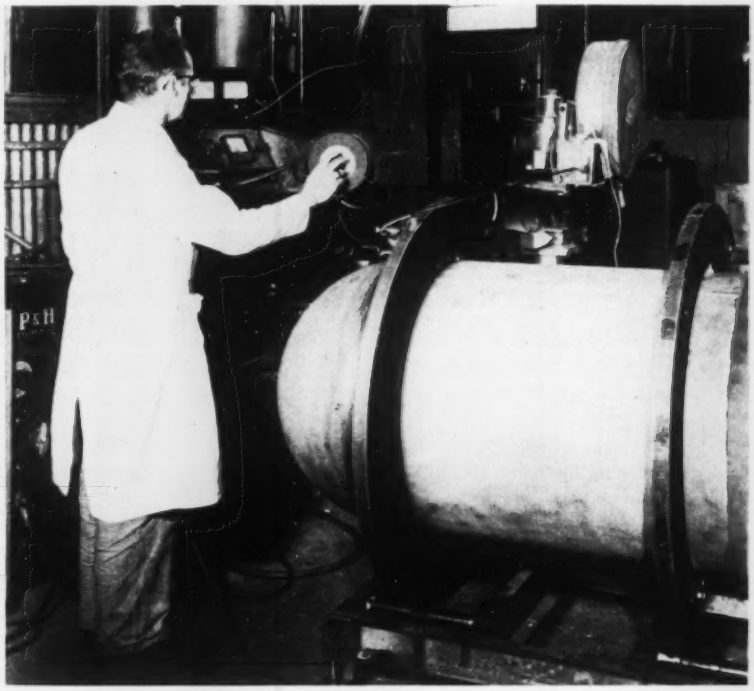
Tests — Gulton Industries combines impingement with a thermal shock test. During an 8-hour period, the specimen is removed and quenched in cold water every 30 minutes and reheated. An equivalent test lasts for 2 hours, with quenches every 15 minutes.

Coatings stand up under both tests. Several examples are being examined for longer periods of service.

High Temperature Endurance—A small, box-type electric furnace was modified to hold a coated specimen so that a ½-in. square on one face was exposed to the room atmosphere. During heating, the outside temperature of the specimen is measured every 15 minutes.

Test plates begin to soften at 1500 to 1550° F, although the coating remains intact. (A lower value than that must be estimated because an insulating blanket forms under stagnant heat conditions. That and a heat reflection factor affect temperature measurements.)

Drawbacks—The coatings have limited chemical resistance and surface hardness. Suggested solutions: A corrosion resistant layer over the ceramic coating; a compromise coating combining the properties of thermal and chemical resistance.



Operator adjusts speed of automatic, submerged arc welder. Tank holds 3000 psi for guided missile, weighs less than 600 lb. After treatment, weld develops 200,000 psi

Better Welds for Missiles

CONSUMABLE weld inserts insure x-ray quality welds in guided missile air tanks made at Research Welding & Engineering Co., Compton, Calif.

The tanks are 60 in. long by 30 in. in diameter. They must hold 3000 psi of air, yet weigh less than 600 lb.

Function—The inserts, made by Arcos Corp., Philadelphia, eliminate the need for back-up rings. They reduce weight, and also permit convenient welding from one side.

Such inserts are part of a process which places a ring of carbon, low alloy, or stainless steel between metal sections to be joined. For example, Arcos 1722-AS material is used for the root passes between the ¼-in. thick heads and the 5/16-in. body. The tanks are made of SAE 4335.

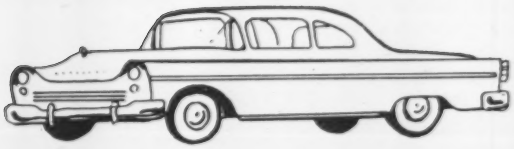
Production—After preparation, the root pass is formed by fusing the insert to the base metal with an automatic, inert gas shielded. tungsten arc. (Frequently, it's done with manual equipment.)

The weld is completed by submerged arc welding with Arcos Chromenar CMV wire. Heat treatment of the weld develops a tensile strength of 200,000 psi, which matches that of the base metal.

Other Applications—The insert method has proved especially effective in pipe buttwelds for conventional and nuclear power plants. It is said to produce sound, crevice-free root passes with smooth inside contours.

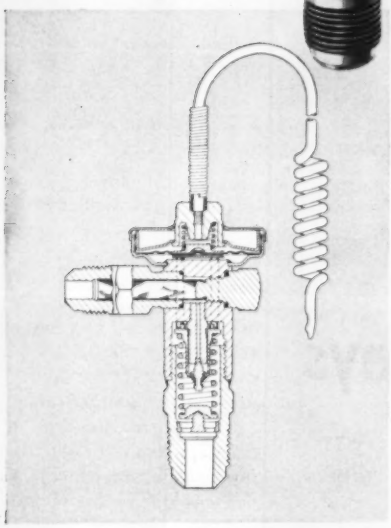
Consumable inserts are catching on for many applications where welds are accessible from one side only.

Studies of this method have shown that, after fusing, the weld puddle shrinks slightly, drawing the inside surface smooth and even with the vessel's walls.



STAINLESS...Where it Counts!

How Stainless Steel From THE HOUSE OF STAINLESS Assures Uninterrupted Performance of Vital Parts in Control Valve for Automotive Air Conditioners



Photos, courtesy Controls Company of America, manufacturers of A-P Controls, Milwaukee, Wisconsin

It's our job at The House of Stainless to help you apply stainless steel where it will do the most good in your product.

A case in point is the experience of this manufacturer of thermostatic expansion valves. In developing their Model 206-C valve which is being used for automotive air-conditioning service, A-P engineers worked closely with CSS metallurgists to select the proper type of stainless that would give each vital part the quality needed for its specific job. Parts subject to greatest wear are made from stainless with the maximum wear resistance, and the possibility of corrosion is eliminated. In every way, the benefits of this collaboration are reflected in the outstanding performance of the product today.

Assistance like this makes The House of Stainless more than just a source of supply. We're always ready to help you apply stainless steel to the best possible advantage—in improving the production, performance and customer-acceptance of your product.

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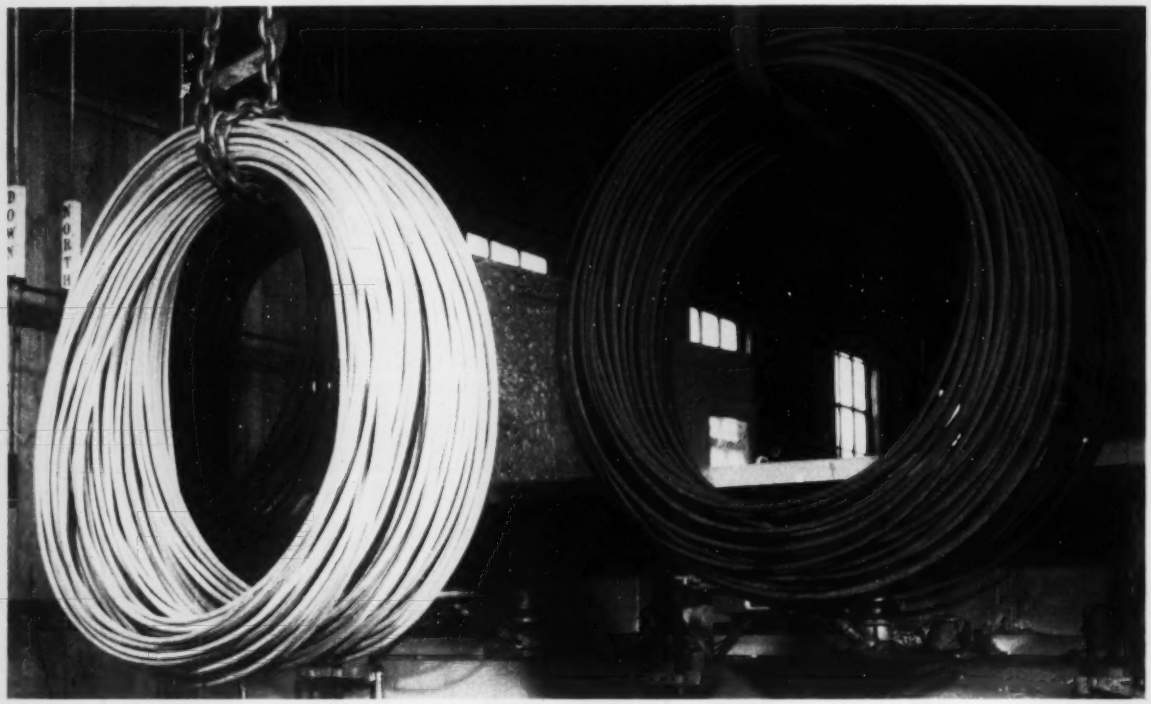

After being descaled in the salt bath and water rinsed, coils are dipped in 19 per cent sulfuric acid, rinsed, then dipped in a nitric-hydrofluoric acid solution to brighten, as shown at left. Following a water rinse, the coils are immersed in the salt bath again to provide an oxide coating, as shown on coil at right

Salt Bath Works Four Ways

Specialty steel mill uses it to descale, oxidize, stress relieve and degrease stainless wire and rods. Outstanding advantage is bath's high oxidizing power

THE MOLTEN salt bath that Northeastern Steel Corp., Bridgeport, Conn., installed when it converted to a specialty mill operation does four things:

- It descales stainless and high temperature alloys.
- It provides an oxide which is an excellent drawing lubricant. The oxide also facilitates cold upsetting and spring winding in customer's plants.
- It is a stress relieving bath for stainless bars and wire.
- It degreases bars and wire.

Scope — Northeastern produces stainless wire, bars and rods in the 300 and 400 series and high temperature, corrosion resistant alloys.

The steel is cast from electric or open hearth furnaces into ingot molds, heated in soaking pits, then rolled on a 34-in. blooming mill. Blooms or billets are ground, turned or scarfed, then rolled on a combination bar mill with a size range of $\frac{3}{8}$ to 6 in. Cold finished bars and wire also are produced here.

Descales—The salt bath (Kolene No. 1 process) built by Kolene Corp., Detroit, converts the oxides produced by annealing or heat treating stainless to an oxide which is easily removed in brightening acid dips. Since the salt does not attack the base metal at operating temperature, metal loss that would occur in straight pickling is practically eliminated.

Transformation of scale to a soluble form takes only a few minutes after the work reaches bath temperature. Acid time is reduced, and acid life is extended. The temperature drop in the bath averages about 20 to 30° F per load, depending on total weight; complete recovery to temperature is reached by the time the work load is removed.

Insolubles—Operating at 800 to 1000° F, the bath is fluid enough to allow carbonates and other insolubles to settle out as waste products or sludge which are removed regularly.

No analytical control of the bath is necessary since no single component is exhausted. Dragout loss is small because the Kolene formula produces a low viscosity bath. Salt is added to maintain the liquid level.

The bath is nonflammable, nonexplosive and has no toxic fumes.

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CONTINUOUS FEED

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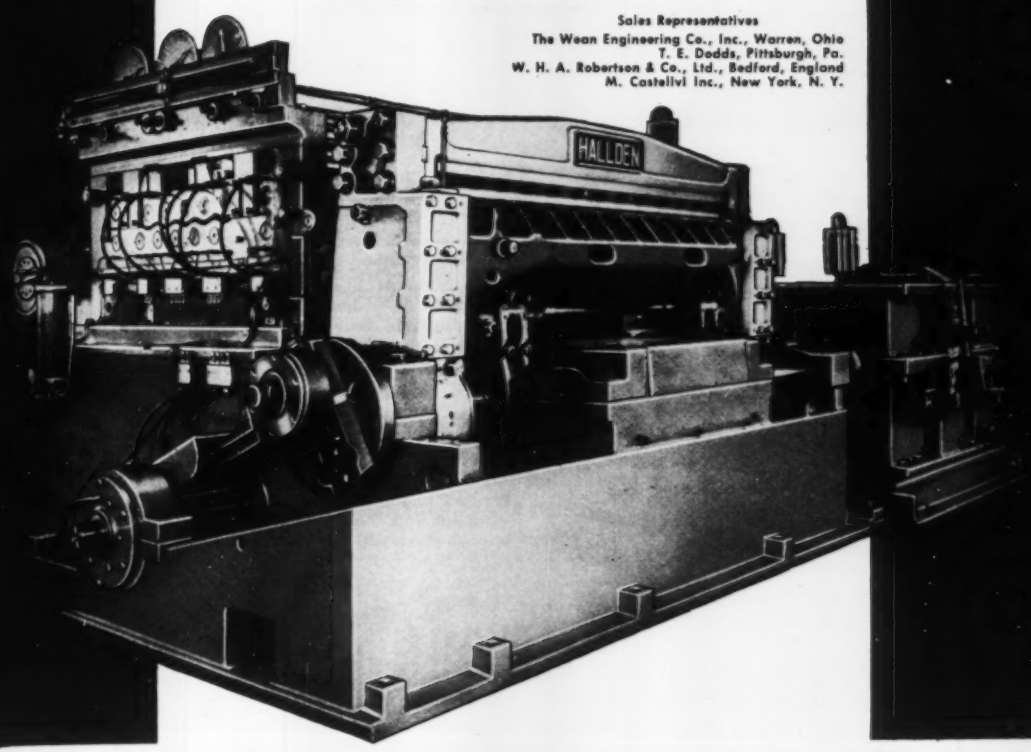

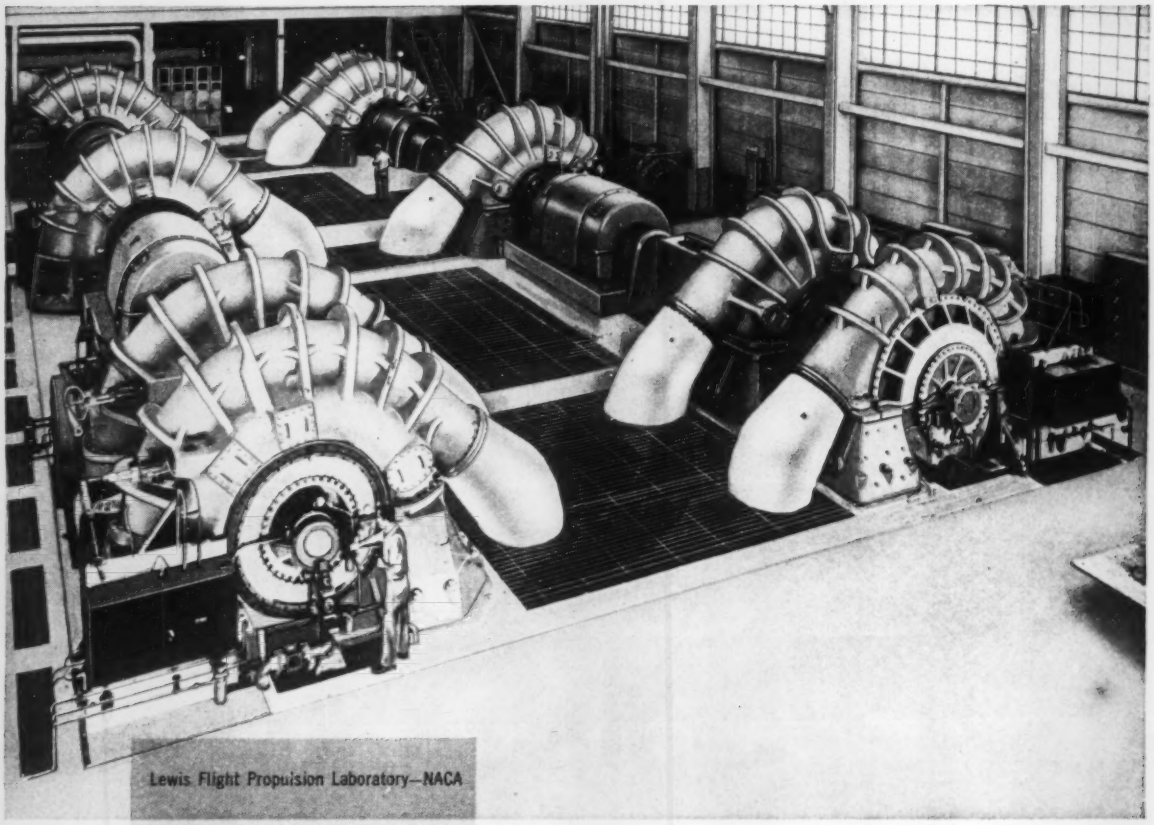

Lewis Flight Propulsion Laboratory—NACA

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atmospheres "in the mass" are created and precisely controlled to order by these giant Roots-Connersville centrifugal blowers at Lewis Flight Propulsion Laboratory in Cleveland, Ohio.

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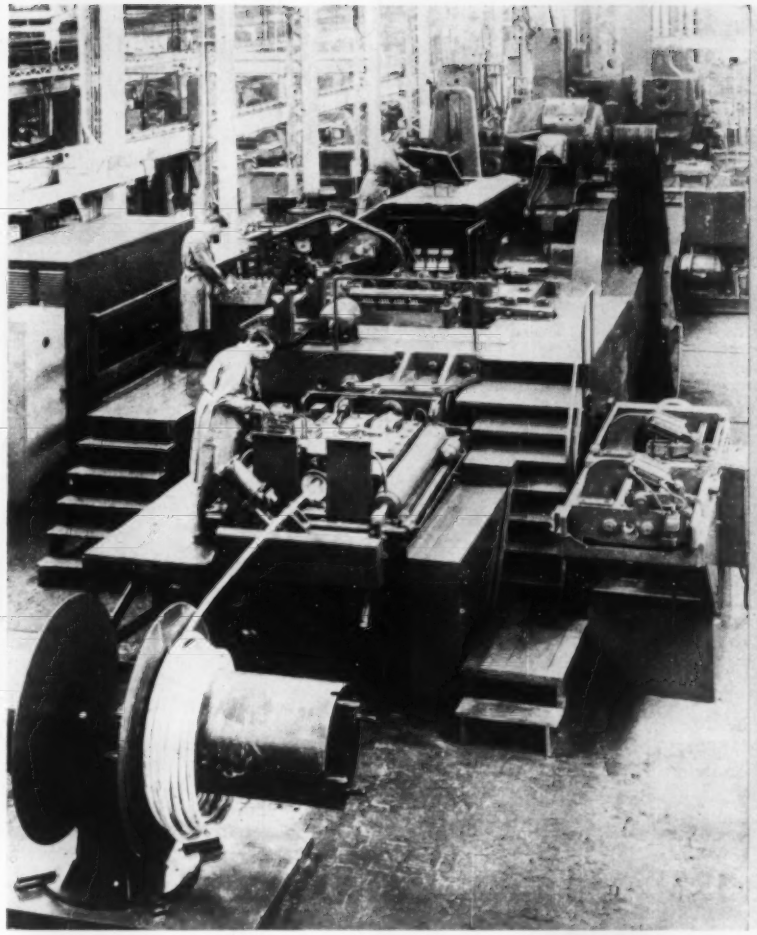
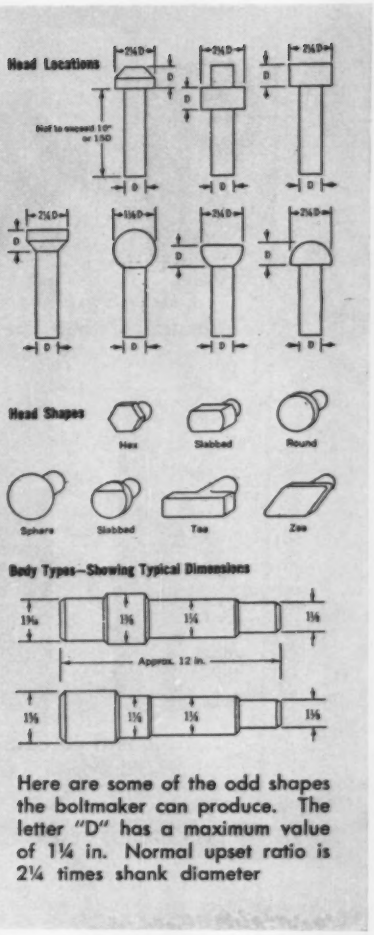




Here are some of the odd shapes the boltmaker can produce. The letter "D" has a maximum value of 1¼ in. Normal upset ratio is 2¼ times shank diameter

Raw material for this giant is wire or rod. Machine turns out extra large bolts headed, threaded, and ready for use. Top speed is about 40 a minute

This Machine Makes 1¼-in. Bolts

Automatic cold forger will also turn out odd-shaped fasteners and components for automobiles, farm implements, aircraft, and electrical products. It's said to be world's largest

AN outsized cold forger is turning out 1¼ in., hex head cap screws up to 10 in. long at Cleveland Cap Screw Co., Cleveland.

The firm says it's the first automatic machine to make cold steel forgings larger than ¾ in. in diameter.

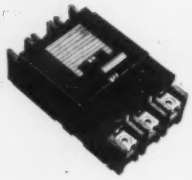
It will also make hexagon, square head, and high strength structural bolts measuring ⅞ to 1¼ in. in diameter.

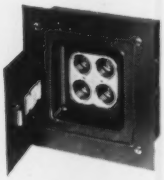
Greater Significance—The Cleveland firm believes that the greatest contribution of the machine is its ability to produce unusually large, odd shaped components such as those illustrated above.

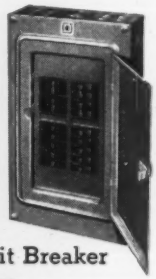
It is also expected to compete successfully with machining and hot forging methods in producing industrial parts: Pinion drive, pump, and transmission shafts; in-

(*Please turn to Page* 144)

• Safety Switches and
Industrial Circuit Breakers

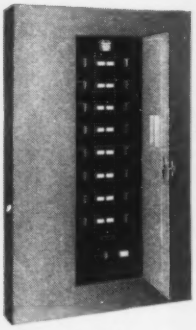




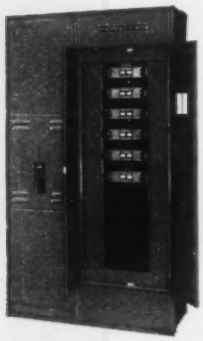


• Fusible and Circuit Breaker
Load Centers

• Voltage Testers

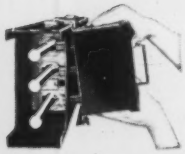


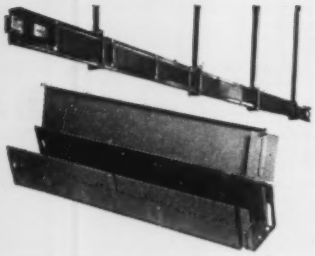
• Fusible and Circuit Breaker
Lighting and Power Panelboards



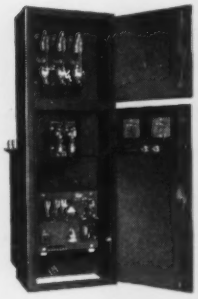
• Power Distribution Switchboards
and Switchgear

Wherever Electricity





• Busways and Wireways



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Control

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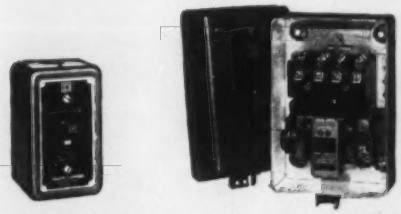
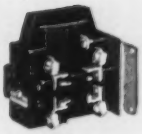
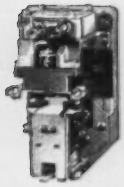


• A.C. Manual and Magnetic Starters

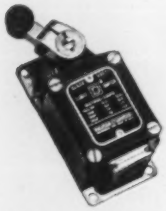
• Drum Switches



• Control Relays

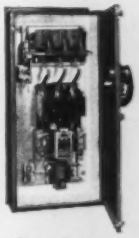


• Timing Relays

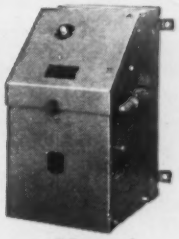


• Limit Switches

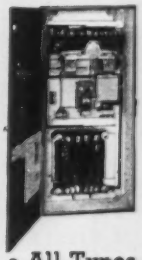
• Pushbuttons



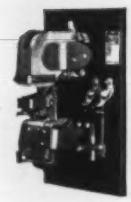
• Combination Starters



• Manual Compensators

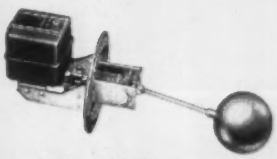


• All Types of Reduced Voltage Starters



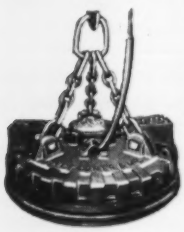
• D.C. Starters

• Electronic and Electro-Magnetic Welder Control

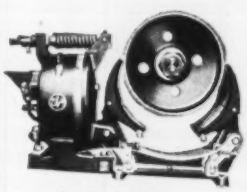


• Float & Pressure Controls for Pumps & Compressors

is Distributed and Controlled



EC&M Lifting Magnets



EC&M Magnetic Brakes

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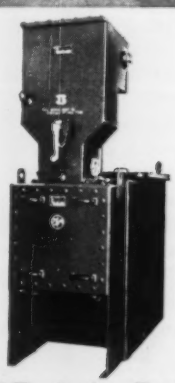
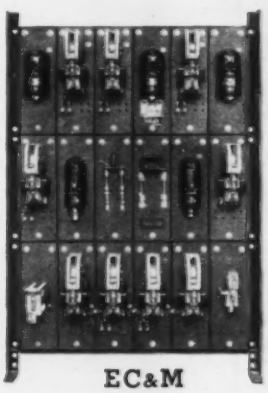


EC&M Explosion-Resisting Control for Petroleum Industry



EC&M Crane and Mill Control

DESIGN LEADERSHIP FOR MORE THAN 50 YEARS

BOLTMAKER . . .

sulator pins; large rivets; coupling bolts; ball-joint suspension parts; and miscellaneous gear blanks.

Description — The machine uses the Kaufman double extrusion process. The raw material is wire or rod larger than the diameter of the finished fastener. A series of operations reduces the metal to a pitch diameter ready for rolling. Automatic heading, pointing, and roll threading complete the part.

Advantages—Products made by cold forging are said to be superior to those produced by other methods. Moving rather than removing metal improves the product three ways: 1. Cold working improves the grain structure, making the part stronger than the raw material. 2. Grain flow lines are maintained rather than cut. 3. Finish is good since there is no scale.

Since all steps are done by one machine, material handling is reduced, setup time is shortened, and scheduling simplified.

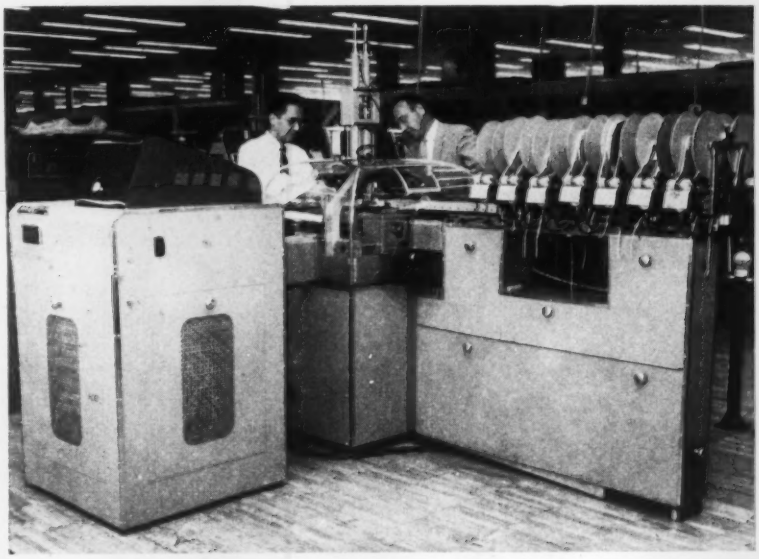
Equipment—The boltmaker has variable-speed electrical controls. They permit the 200-ton machine to operate at speeds between 4 and 40 rpm. Precise control aids especially large upsets.

Design Problems—The machine was constructed by the National Machinery Co., Tiffin, Ohio. It made the first boltmaker used by Cleveland Cap Screw in 1935; since then, several larger ones have been made to handle bolts up to ¾ in. in diameter.

National Machinery says it solved several unusual problems in making the machine. Huge, heavy-duty castings for the base were hard to handle. Heat treatment of the thick crankshaft required careful quenching and tempering.

Cleveland Cap Screw says that the new machine makes it the only producer of large, cold formed, hex head cap screws. It cost $500,000 and more than five years to whip the design and construction problems.

Suggestions — Engineers at the firm expect to penetrate the market for unusual fastener shapes, some of which are illustrated on Page 141 (top). Many such parts are currently made by machining or hot forging. Cold forging is less expensive.



Engineer is looking at the working head of assembly machine. It inserts parts into circuit boards at rate of one per second. Assemblies are used in computers

Assembly by Punched Card

Electrical resistors, capacitors are stored on masking-tape belts held by reels which feed parts into printed circuit boards. Pattern is controlled or changed by cards

THE machine in the illustration (above) automatically assembles electronic parts on printed circuit panels.

Made by IBM, New York, it is an improvement over older models. Components are arranged or changed through instructions on punched cards. Manual resetting is obsolete.

Purpose—The device is called the the programmed component assembly system. It assembles wiring panels for IBM data processing equipment.

Engineers point out that the machine is ten times faster than manual methods. It also produces a more uniform product.

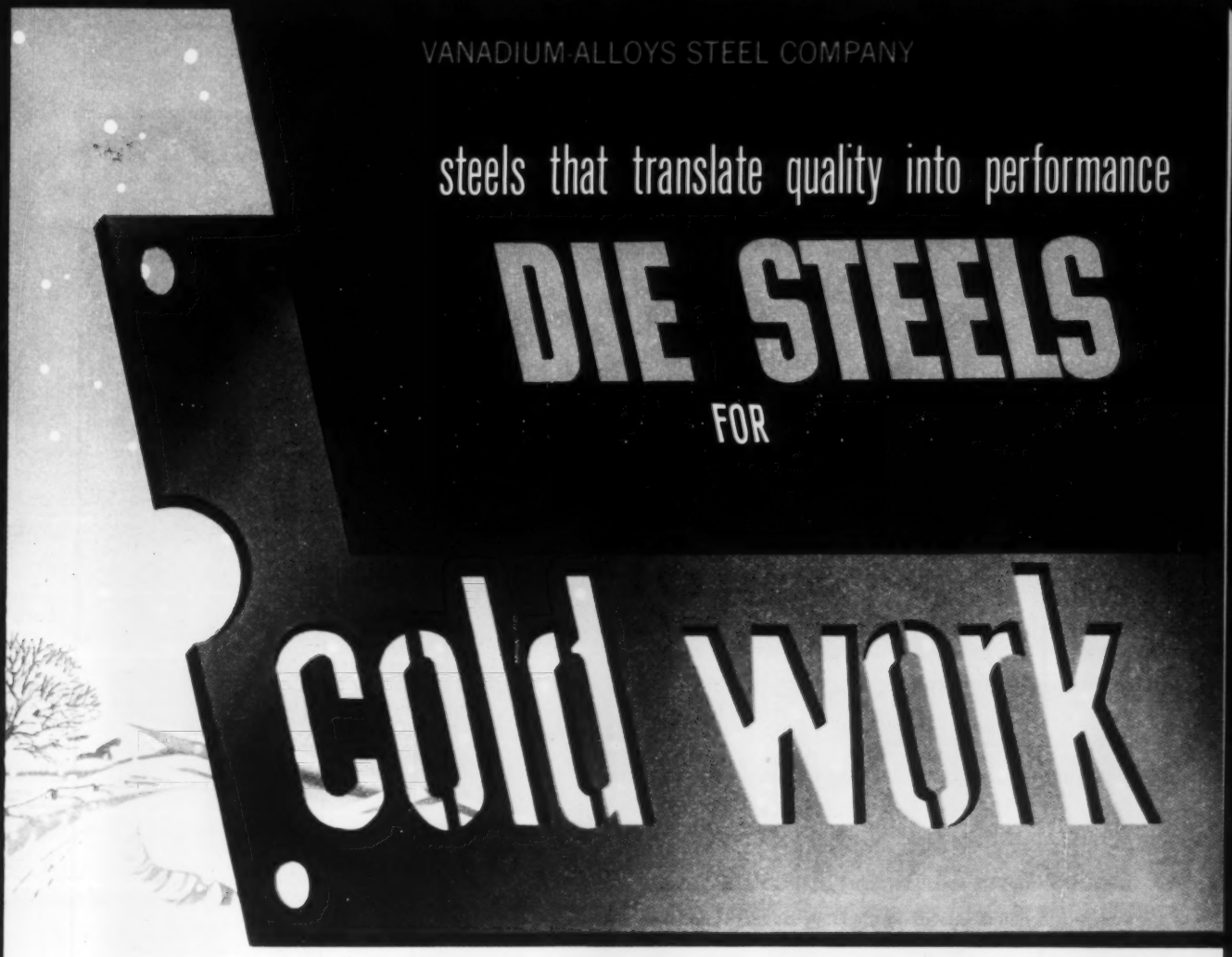
Printed wiring boards are the latest technique in eliminating bulky wiring of complex electronic devices. They are about the size of post cards. Resistors and other parts are attached so that the printed wiring connects them.

Size Is Key—To make possible such an operation, all components are made in one of two sizes. They are grouped according to electrical values and mounted on masking tape belts. Cutoff reels which hold belts resemble ammunition drums.

Any number of reels can be accommodated by changing the length of the rack.

Available—IBM built the machine for its own use, but its Special Engineering Products Div. may make such machines for industry.

The proposed market version is expected to cost more than $100,000. Its extreme simplicity and economy of changeover make it valuable for low production runs of a variety of assemblies.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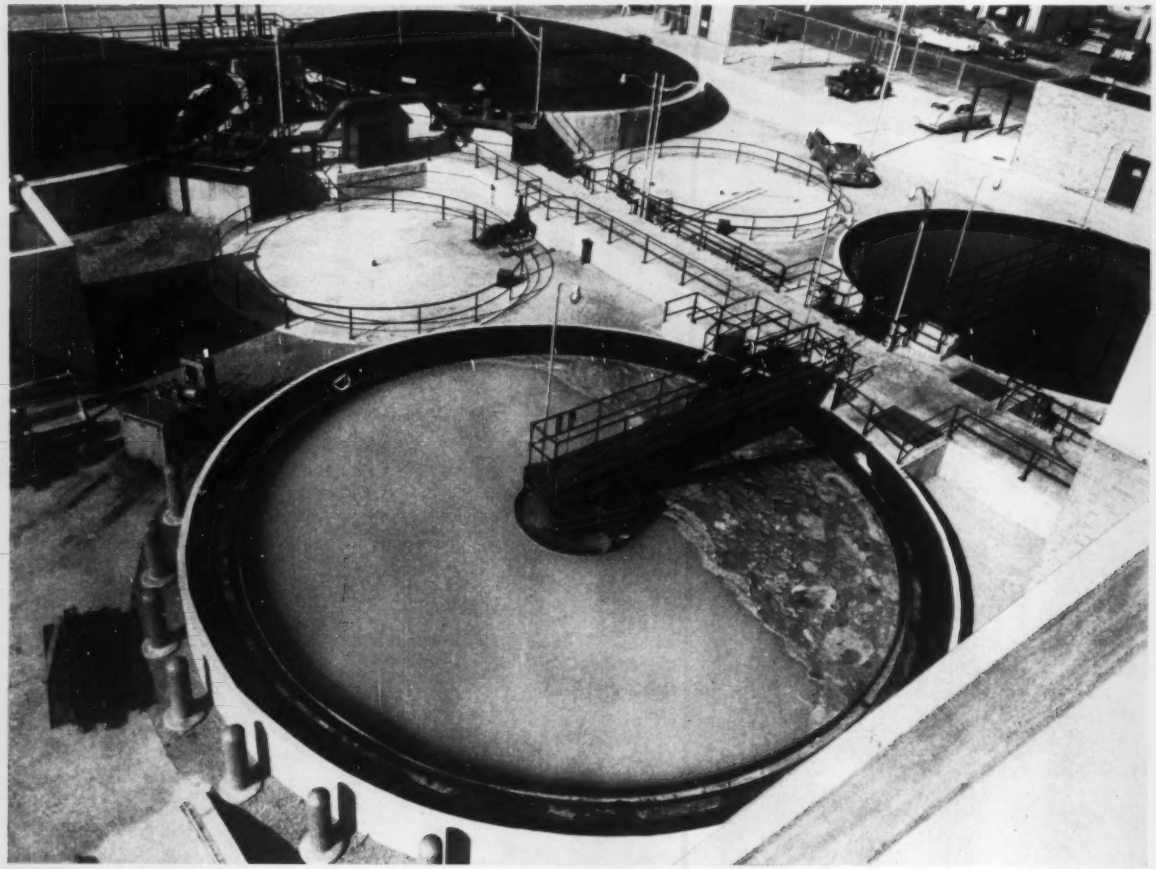


Raw waste enters one of the holding basins, front, then is mixed in tanks, not shown, and piped to clarifiers, rear. Underground tanks, center, contain salvaged oil

One System Handles Many Wastes

MEMO TO MANAGEMENT

Waste treatment is a legitimate production cost. Aside from causing the loss of useful materials, improper disposal can lead to poor community relations and court action. Here's an example of what can be done: Buick's new treatment system reduces costs by reclaiming oil and using spent acids to treat other wastes. It disposes of wastes gathered from nearly 10 million sq ft of diversified manufacturing plants.

BUICK's new disposal plant at Flint, Mich., handles a variety of wastes from stamping, painting, plating and assembly operations:

- Spray booth residues.
- Pickle acids, HCl, H_2SO_4, and HNO_3.
- Chromic acid from plating and phosphating operations.
- Wastes from nearly 300 cleaning machines.
- Both soluble and insoluble oils.

Details of the system were described at the Twelfth Purdue Industrial Waste Conference, Purdue University, Lafayette, Ind., by R. J. Brink, supervisor, trade waste plant, Buick Motor Div., General Motors Corp.

Size—Tank capacities and pump-

A—SLUDGE & EFFLUENT

Pumps draw off sludge, and oil and scum are skimmed from the top as main body of liquid is purified.

B—OIL RECLAMATION

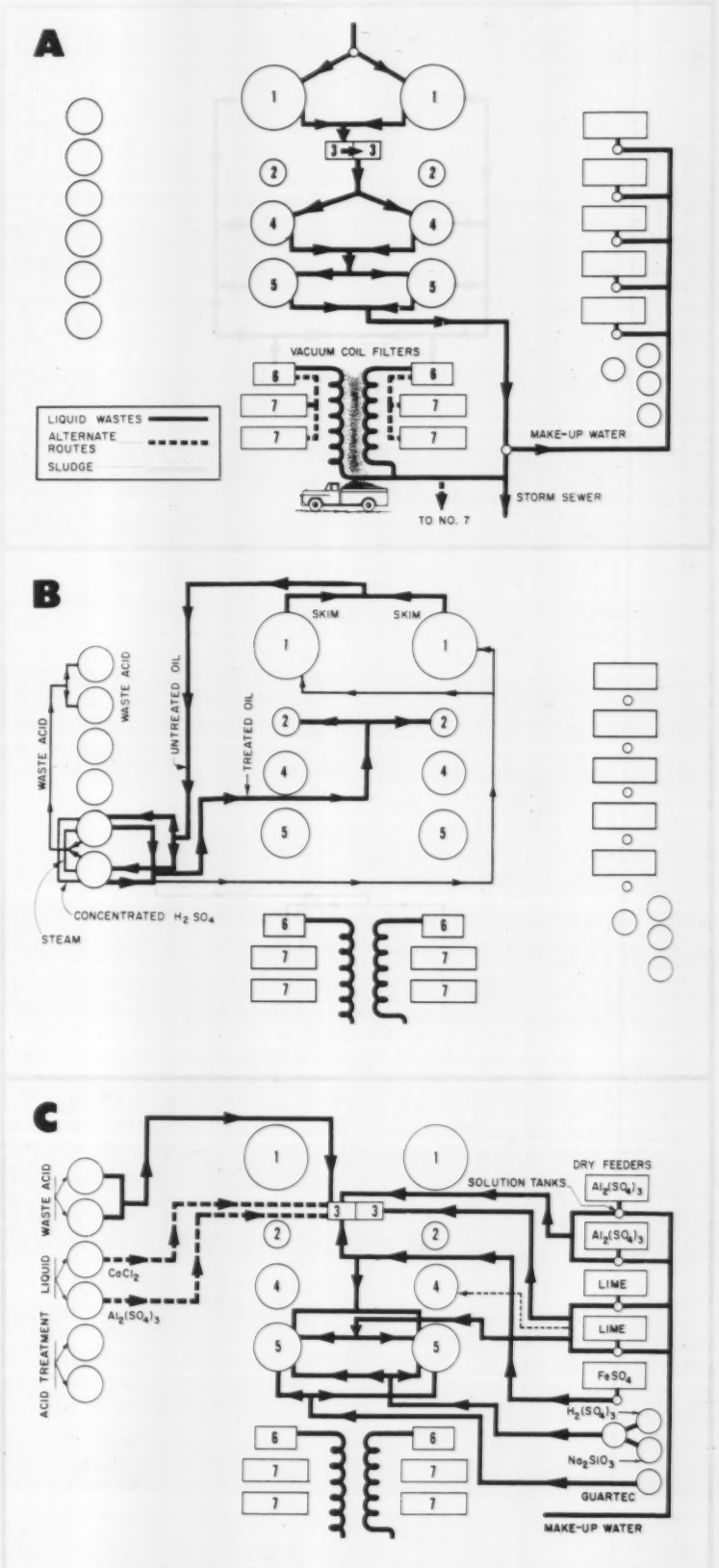
Floating oil is skimmed from the holding basins and piped to tanks for treatment with steam and sulphuric acid.

C—CHEMICAL ADDITIVES

Feed rates and chemical treatment are determined for each batch of waste.

KEY

1. Holding basins.
2. Oil storage tanks.
3. Primary mixing tanks.
4. Primary clarifiers.
5. Final clarifiers.
6. Sludge settling tanks.
7. Dry sludge beds.



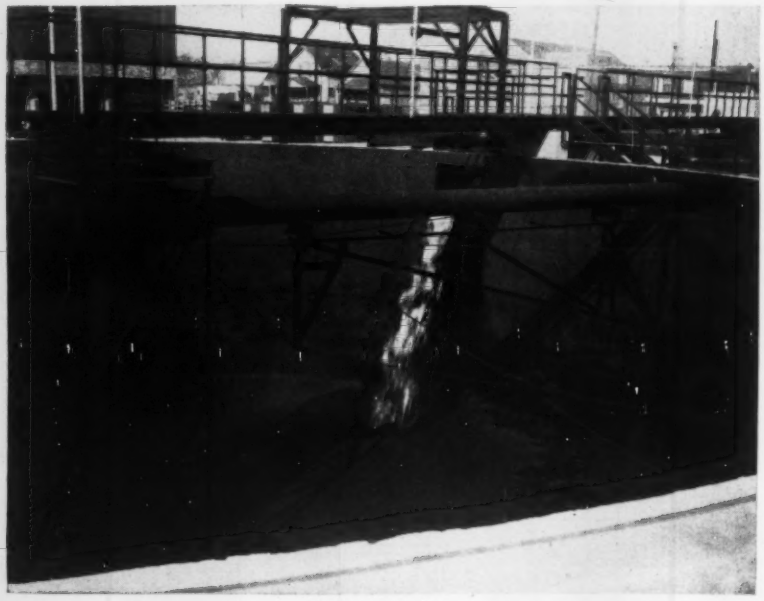
ing rates were designed for a peak production of 1 million cars a year. The disposal plant (capacity 1600 gpm) treats all industrial wastes except cyanide, which is handled by a separate plant.

Flexibility of the plant enables it to handle an increasing load—water consumption per car built has increased nearly 50 per cent in about eight years.

A sump system collects plant wastes and relays them to pumping stations via overhead lines. The pumping station then moves the wastes through overhead and buried lines to the treatment plant. All wastes are piped except the pickle acids. They are moved by truck.

Procedure—The flow of wastes, the addition of chemicals, and oil recovery are diagrammed in the charts at right.

Valves direct the flow of oily wastes into one of the two holding basins. When a basin is full, treatment starts, and the wastes



This basin will hold 750,000 gallons of industrial wastes. Processing pumps blend (by recirculation) the tank when it is full

WASTE SYSTEM . . .

are piped to the other basin.

Processing pumps blend the full basin by recirculation. The pumps have a capacity of 2000 gpm and are powered by 50-hp motors.

Samples of the mixture are taken to the laboratory for jar tests to determine the treatment and chemical feed rates. Oil content, alkalinity, and chrome concentration are also determined. The operator controls the processing from a main control panel.

A rotating skimmer blade takes off oil from the holding basin. Scraper blades on the bottom of the tank move the sludge into two small sumps in the center of the tank. From there it is pumped to the sludge settling tanks.

Add Chemicals—Liquid wastes are pumped from the holding basins into the mixing tanks where chemicals for the primary break are added.

Liquid calcium chloride and liquid aluminum sulfate are used when their cost is less than the dry chemicals mixed in the solution tanks.

Waste pickle acids are added at the primary mix tanks. This disposes of the waste acid and at the same time breaks the water soluble oils.

The ferrous iron reduces chrome from hexavalent to trivalent. When there is not enough waste acid, ferrous sulfate, plus sulfuric acid, is used to reduce the chrome.

Lime is fed into the second chamber of the primary mix tanks to give better settling in the clarifier unit.

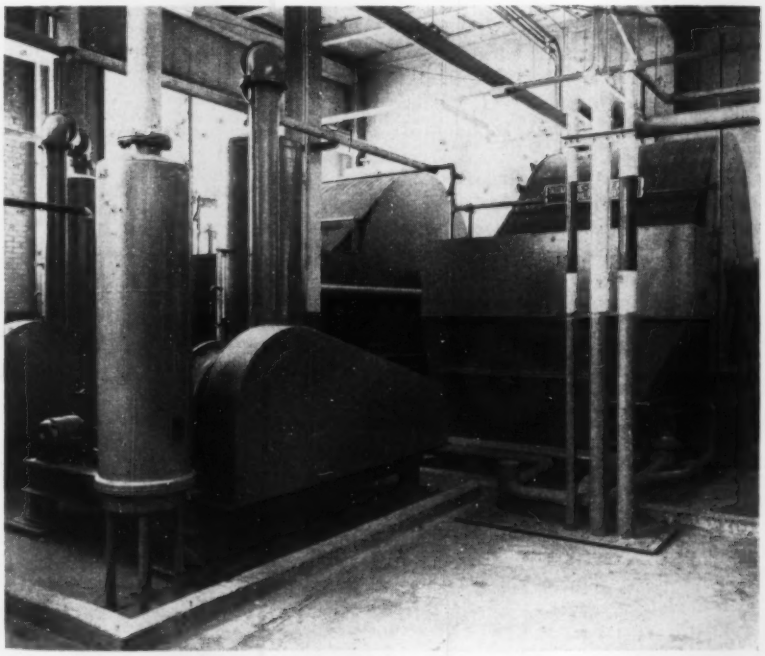
The tanks have a 5-minute retention time at a processing flow rate of 1600 gallons a minute.

Clarifiers—The flow from the primary mix tanks is divided so that half goes to each of the primary clarifiers. Sludge settling out in these units is drawn off at a predetermined rate to the settling tanks.

The solution overflows the primary clarifiers and enters a common line. The flow is divided, then enters the final clarifiers from the bottom. Flocculating materials, such as lime, activated silica, ferrous sulfate, and Guartec (a non-ionic coagulant derived from the Guar bean) are fed into the stream as it comes from the primary clarifiers.

Sludge is drawn off automatically from the final clarifiers to the sludge settling tanks. The effluent from the final clarifiers is pure enough to be used as make-up water or to be discharged to storm sewers.

Handling—Each settling tank is equipped with two chain driven flight scrapers. One pushes sludge to one end of the tank, and the



These vacuum coil filters discharge caked sludge into trucks. Water from the filters is sent to the storm sewer, or to sludge beds

6,000 horsepower in a single CLARK CBA-8 balanced/opposed compressor

Now, for the really big applications, Clark introduces the most powerful compressor ever built—the new CBA-8. The ability to handle tremendous horsepower, however, is not the only feature of this new compressor. Being extra heavy and rugged in all respects, it is the perfect choice for those services where extremely high pressures are required such as in the process industries and for high pressure wind tunnel applications.

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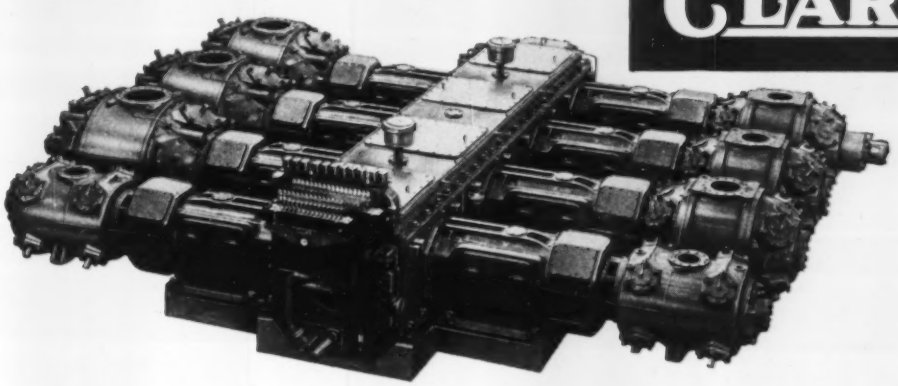

other pushes it across and into a sump.

A pipe is mounted on a swivel anchored at one end and near the bottom of each tank. This enables the tank to be decanted at any level. The water or sludge can be pumped to two Komline-Sanderson vacuum coil filters, or, in an emergency, to any of the sludge beds.

Equipment — The holding basins are made of concrete and coated with a Bitumastic cement penetrant. These tanks are 70 ft in diameter, cone shaped on the bottom and hold about 750,000 gallons.

Each of the underground oil storage tanks can hold 100,000 gallons. Gages indicate the amount of oil. The Koroseal-lined tanks are 30 ft in diameter and have a cone-shaped bottom.

The primary mix tanks are 9½-ft square on the inside. An overflow connects the tanks 6 ft from the bottom. Each side has a capacity of 4061 gallons. Walls are lined with Koroseal.

Each of the primary clarifiers will hold 100,000 gallons. These cylindrical concrete tanks are 45 ft in diameter and coated with a Bitumastic cement penetrant. The final clarification units are 50 ft in diameter. Each has a capacity of 200,000 gallons.

Sludge Handling—Each of the two sludge settling tanks is 20 x 41 ft and has a capacity of 100,000 gallons.

There are four sludge beds, which are 70 ft long, 20 ft wide and 3 ft deep. They are made of 9 in. of coarse gravel, 4 in. of fine gravel, 9 in. of sand, and 3 ft of freeboard.

One end of each drainpipe emerges vertically. It is used as a breather and for flushing out in case of plugging.

Concrete splash pads and metal splash guards are placed where sludge and water are pumped into the beds.

Saves Oil—Oil can be skimmed from the holding basin and sent directly to the oil storage tanks. But it is usually necessary to send it to the oil treatment tanks. Heat, applied through steam injection,

Buick Predicts Flow Rates This Way

Type plant	Gallons of waste per hour per 100 sq ft of manufacturing area
Assembly	1.2
Automatic transmission	1.1
Motor	1.6
Stamping	0.6
Machine shop	0.91
Axle	1.5
Conventional transmission	1.08

Sludge is pumped from the final clarifiers to the two settling tanks. From there it goes to the coil filters or one of the four sludge beds

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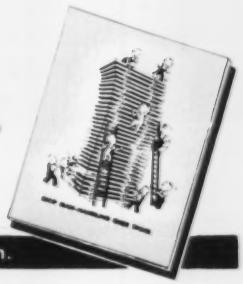

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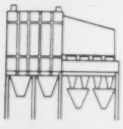

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WASTE SYSTEM . . .

sometimes with sulfuric acid, is used to treat the oil so that it can be sold or burned.

The treated oil is pumped to storage tanks. From there it can be loaded into railroad tankers or tank trucks.

Water from the oil treatment tanks is pumped to the holding basins. Sediment from the operation is pumped to one of the sludge settling tanks.

An inverted steel cone is mounted at the bottom outlet of the storage tanks so that any water may be easily separated from the oil.

Skimmings from the clarification units make the oil taken from the raw holding basins unsalable. Waste skimmings are directed to the sludge settling tanks.

Some cleaners used in washing machines give trouble in oil reclamation. A peculiarity in their compounding causes the cleaners to go into the oil layer and take large quantities of water with them. The subsequent floating mass cannot be separated by the system.

Safety—All pumps and motors in the system can be replaced from a reserve stock. All motors and electrical outlets below ground level are explosion-proof.

Most of the equipment and machinery used in processing the waste are controlled from the main panel.

All the sump pumps and equipment controlled by the panel are incorporated into an alarm system. A bell and a flashing light indicate any pump failure, any sump that has reached its emergency high level, or any equipment which has been shut off at the panel or at the machinery itself. The sound and the light cannot be cut off until the operator presses the proper button which indicates that he knows the location of the trouble.

The pH is recorded continuously in both stages of the primary mix tanks. Water from final clarifiers is sampled continuously and automatically. Its pH is also continuously recorded.

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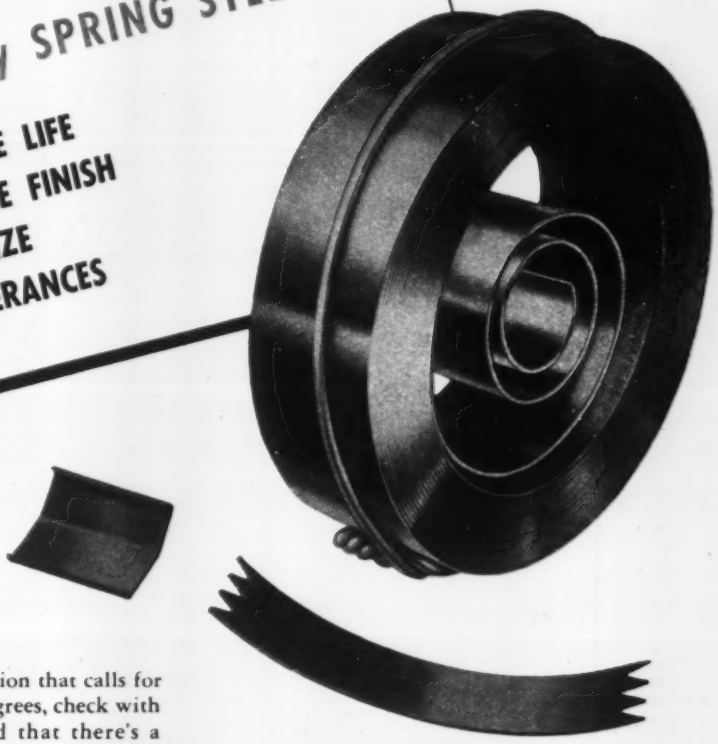

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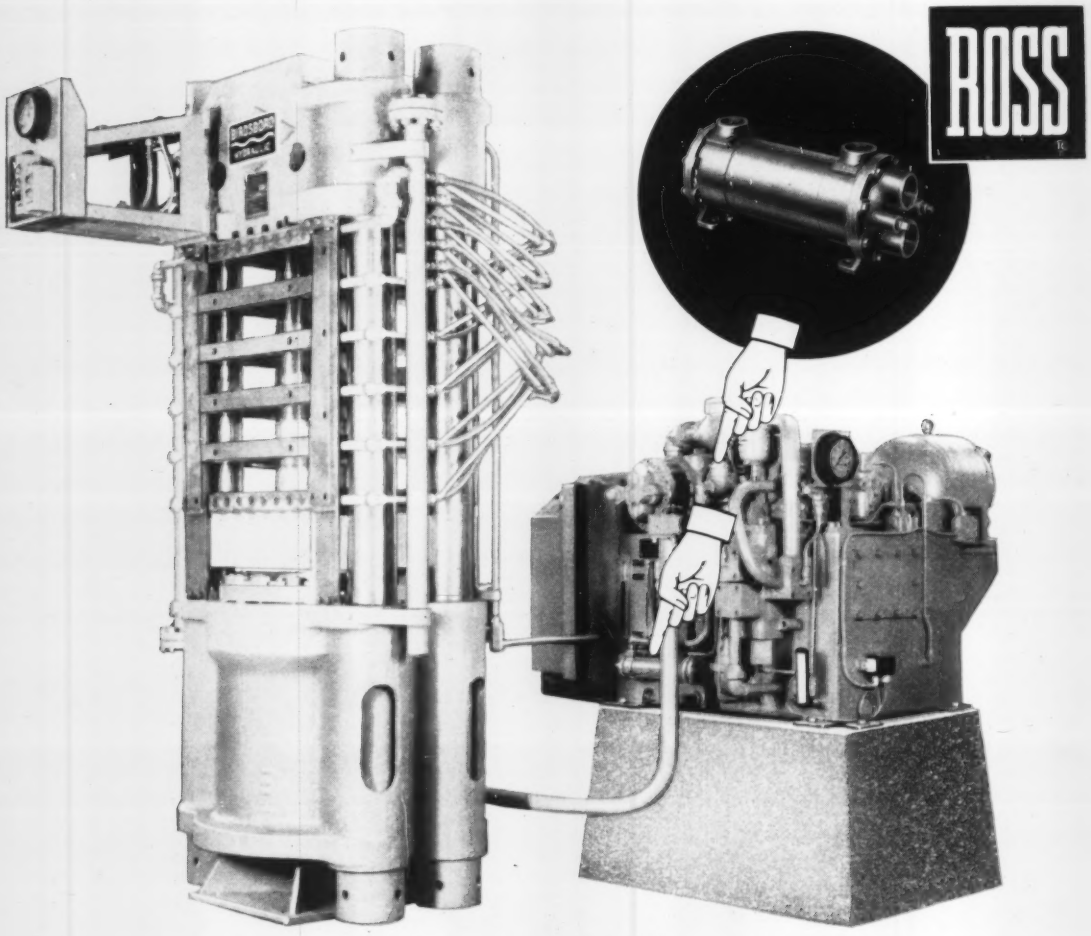
Squeezing out grinding wheels by the dozens this Birdsboro Press relies on a ROSS EXCHANGER for constant oil temperature



Exerting up to 600 tons of pressure, this Birdsboro hydraulic press turns out approximately 45 grinding wheels during one curing period.

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12-Ft Gaging Unit

It's being used for inspection of jet aircraft engine parts. Accuracy is 0.00001 in.

THE Aircraft Gas Turbine Div. of General Electric Co., Evendale, Ohio, has a new 12-ft measuring machine.

Reading directly to 0.00001 in. with controlled measuring pressure, it was built by Pratt & Whitney Co. Inc., West Hartford, Conn.

Essentials — Basically, the machine consists of a master bar, measuring head, and Electrolimit tailstock, all mounted on a rigid bed.

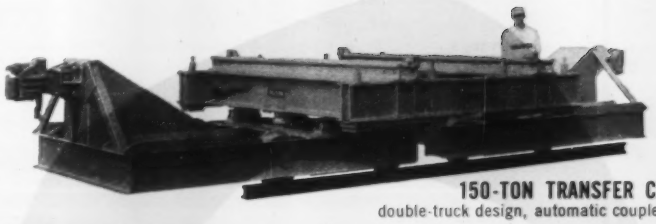
The measuring bar has 144 stainless steel buttons. Each carries a hairline that is exactly 1 in. from the adjacent buttons. The hairline is visible through an attached 75-power microscope and is used for setting each inch of length on the part to be inspected.

MEASURING MACHINE
. . . can handle parts 144 in. long

Operation — Measurements are taken from a vernier on the headstock that reads to 0.00001 in. The measuring screw has 1 in. of travel.

Pressure control through the tailstock is important in obtaining precise readings. The tailstock is graduated to provide 1 to 2½-lb of pressure.

The measuring machine is ready for use when the head is properly positioned to the hairline on the master bar and after the tailstock is adjusted to the required pressure.



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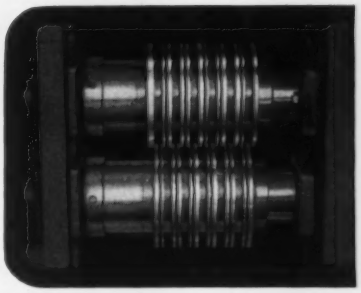

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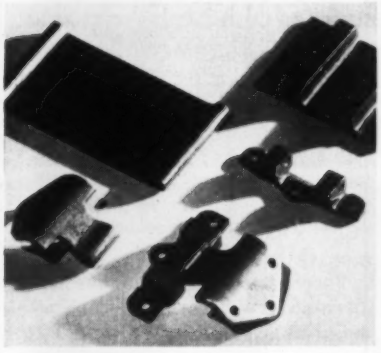
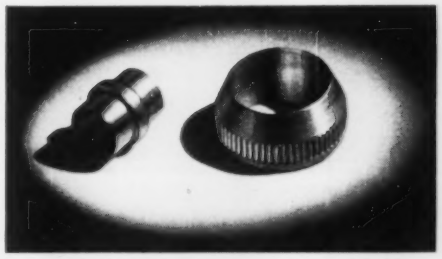
It will pay you to get the complete story on Republic Cold Finished Steel Bars in relation to your production targets. Simply call your local Republic representative or steel warehouse. Mail coupon for literature.

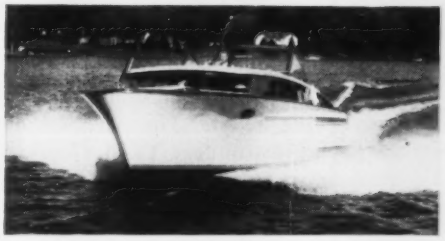


YOU CAN SCORE SAVINGS on many expensive-to-machine parts by taking full advantage of Republic Special Sections. Hot or cold pre-forming eliminates excess metal, reduces required finishing operations, cuts scrap to the bone. Special Sections are available in all grades of carbon, alloy and ENDURO Stainless Steel. Mail coupon for complete information.

HIGH PRODUCTION TARGETS set by Flodar, Inc., Cleveland, Ohio, for these hydraulic line fittings were met by using Republic Leaded Cold Drawn Alloy Steel. Machining speeds were increased 200% over the maximum rate possible with the same alloy, unleaded. Other advantages include fine finish, negligible scrap loss, and excellent tool life. Investigate Republic Leaded Cold Drawn Steels for your high-production parts problems. For information, mail coupon.



HIGH STRENGTH-TO-WEIGHT GOALS for mobile products like this steel pleasure cruiser are met with Republic High Strength Steel. Weight savings up to 30% can be made, with no sacrifice of safety or service life. Further, corrosion resistance of Republic high strength is many times that of ordinary carbon steel. Send coupon for facts.



STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. C-3818A
3120 EAST 45TH STREET • CLEVELAND 27, OHIO

Please send me information on:

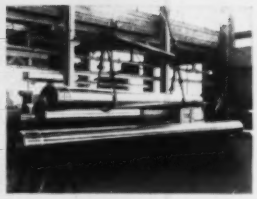
- ☐ Cold Finished Steel Bars
- ☐ Cold Finished Leaded Alloy Steel Bars
- ☐ High Strength Steel
- ☐ Special Sections

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____



Your parts last longer when they're

SHENANGO CENTRIFUGAL CASTINGS

Your machine parts, ferrous or non-ferrous, are subject to stress, strain and friction, day after day, year after year . . . so specify Shenango . . . and see what a difference this makes!

Shenango's centrifugal casting process insures longer life because of finer, more uniform, *pressure-dense* grain to begin with . . . free of inclusions, porosity, blowholes and other weakening defects. Then, far less machining is needed and your part is stronger . . . to last and last *and last!*

Shenango's modern and fully-equipped shops will supply you with ferrous or non-ferrous symmetrical parts in virtually any shape or size . . . rough, semi-machined or precision-finished to your most exacting specifications. For full details, write: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, Ohio.

SHENANGO CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE* METAL • ALLOY IRONS

Army Evaluates Steels

Results of five years of research on the extent cold worked steels might replace the more strategic heat treated alloy steels are presented in *A Handbook on the Properties of Cold Worked Steels* (PB 121662, 113 pages, $3.).

Tables present the important engineering properties of the material and the factors to be considered in design selection.

Chapters are devoted to the mechanism of cold working, composition effects, residual stresses, directionality, benefits and limitations, costs, and applications.

Literature Survey on Leaded Steels (PB 111917, 38 pages, $1.) is an evaluation of published information on the manufacture, fabrication, and properties of leaded steels. The volume also discusses the history and technological aspects of leaded steel, machinability, and applications.

Both books can be ordered from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

How To Finish Steels

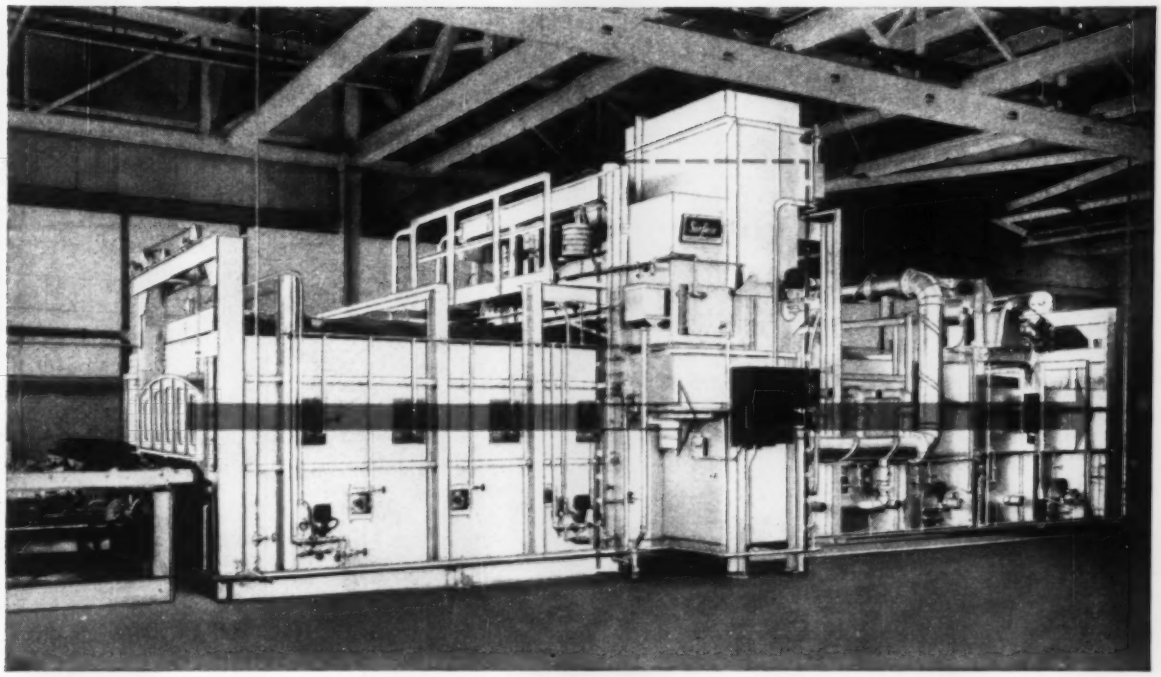
Can prefinishing of steel be done more economically in the steel mill or in the fabricating plant? Can a mill strip grind carbon steel and sell it as polished stock at a profit? Can a mill achieve a No. 3 quality through a slight reduction on bright rolls, and sell it without prohibitive extras?

Those are among the questions discussed in a motion picture produced by Minnesota Mining & Mfg. Co., St. Paul. It shows mill and fabricator practices in finishing stainless and carbon steel.

The color film, "A Challenge for Steel," is shown to production, sales, and executive management personnel of steel mills and fabricating plants as part of a presentation dealing with coated abrasives and their application to production line problems.

In-plant meetings include a review of coated abrasive components, a technical presentation of factors affecting their use, and a discussion period. Among the finishing methods shown in the film are those for wide sheet grinding and polishing, strip scouring, and coil grinding.

Superfast cooling for cycle annealing



A furnace-within-a-furnace makes this Surface cycle annealer one of the most versatile heat treat units in the country. It anneals, cycle anneals, and normalizes gear forgings of different size, shape, and alloy at the net rate of 864,000 lbs. per month or better.

Such exceptional versatility is achieved by a superfast cooling zone. Really a full convection furnace within a direct-fired furnace, this zone is isolated by refractory doors. It can be used or by-passed, depending on which of many cycles the customer wants. As a result, the customer can heat treat as many as 13 different alloys in this one furnace.

Adding to the flexibility of the furnace is a modular tray design. Each module is an 18x20-inch chrome alloy casting. Modules can be combined to hold any size of work up to 800 pounds. They are also used to carry work outside the furnace.

This furnace-within-a-furnace is another proof that Surface engineers are old hands at creating new ideas in heat treating.

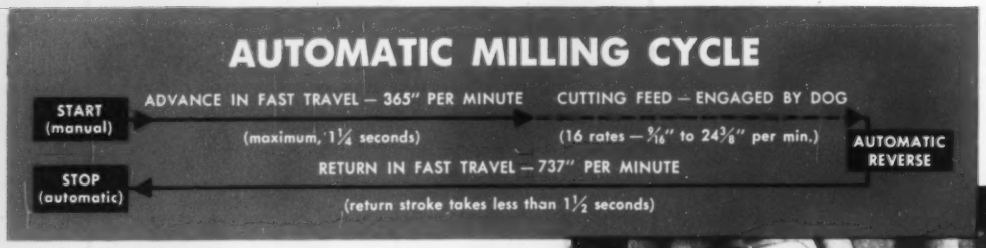
Write for Bulletin SC-146 on cycle annealing.

Surface Combustion Corporation, 2385 Dorr St., Toledo 1, Ohio. In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ontario.

wherever heat is used in industry

Surface

The BROWN & SHARPE No. 000 – with the


AUTOMATIC MILLING CYCLE
START (manual)
ADVANCE IN FAST TRAVEL – 365" PER MINUTE
(maximum, 1¼ seconds)
CUTTING FEED – ENGAGED BY DOG
(16 rates – 3/16" to 24⅜" per min.)
AUTOMATIC REVERSE
STOP (automatic)
RETURN IN FAST TRAVEL – 737" PER MINUTE
(return stroke takes less than 1½ seconds)

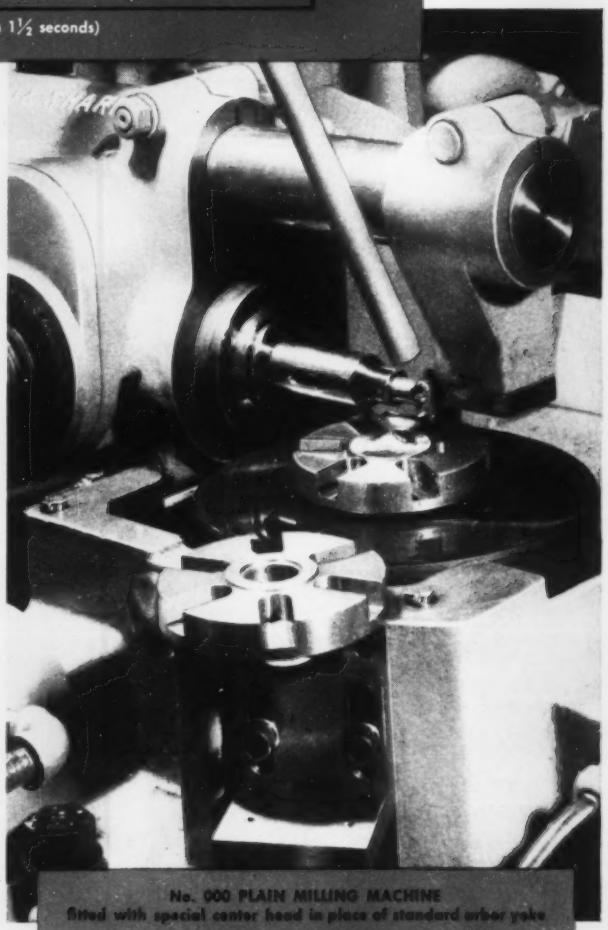
Special machine productivity with unlimited adaptability

Set up with conventional work-holding equipment, the Brown & Sharpe No. 000 Plain Milling Machine is the reliable pace-maker for rapid production milling of small parts.

For exceptionally long runs, fixtures of special design further increase the basic high-production potential of the No. 000. Such fixtures provide automatic indexing, continuous loading with automatic clamping, and other forms of automation, with record savings in milling cost.

With a special fixture on a standard machine, you get the high-speed production advantages of an expensive single-purpose special machine. You save on equipment cost and you avoid the risk of costly obsolescence due to later changes in product design. The unlimited adaptability of the basic machine permits easy conversion to revised operations, or other jobs.

Brown & Sharpe specialists in fixture design will survey your operations and make recommendations at your request. Let them show you how to make your investment in production milling equipment pay the highest return in savings. For complete information, write: Brown & Sharpe Mfg. Co., Providence 1, R. I.



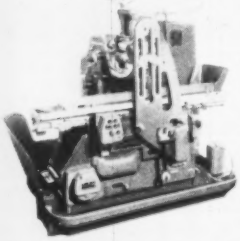
No. 000 PLAIN MILLING MACHINE
fitted with special center head in place of standard arbor yoke

SPECIAL AUTOMATIC INDEXING FIXTURE
Operator loads fixture and starts machine. Cycle continues until final cut . . . then machine stops automatically.
Cutter — Special carbide-tipped angular milling cutter 1¼" dia.—held in special collet
Part Turret indexing plate Material C1120 Steel
Operation Mill 83 radial notches on face of hub
Cutter Speed 835 rpm Feed Rate 24¼" per min.
Production 10 PIECES PER HOUR

Heavier production units powered for the larger work size range

No. 12 PLAIN MILLING MACHINE

3, 7½, or 10 HP Spindle Drive



The home of PRECISION CENTER B·S

Brown & Sharpe

MILLING, GRINDING, AND SCREW MACHINES • CUTTERS
MACHINE TOOL ACCESSORIES • PRECISION TOOLS • PUMPS

Horizontal Milling Machine Has 34 Speeds

The No. 5 is a boring, drilling, and milling machine with a spindle 5 in. in diameter.

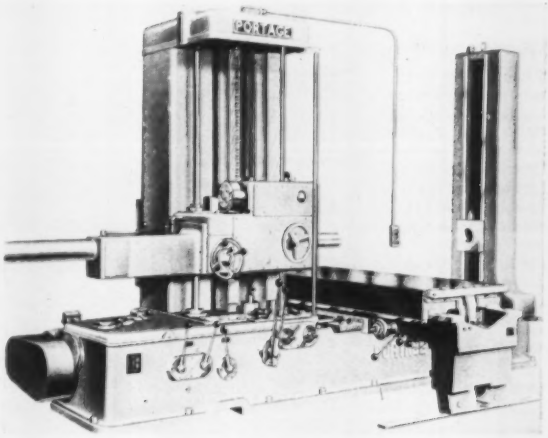
The machine has a vertical head travel of 48 in. The cross travel of the table on the saddle is 60 in. The working surface of the table is 36 x 72 in.

Speeds range from 7 to 1000 rpm. With the tailstock mounted, the longitudinal travel of the saddle is 52 in. Maximum distance of the spindle sleeve to the tail block is 90 in.

The headstock has an independent, motor-driven pump that insures a constant flow of oil to bearings and gears. A fan forces a flow of air through the headstock over ventilating ribs to dissipate heat from the spindle sleeve bearing.

Optional ranges and sizes have 36, 60, or 72 in. of vertical head travel, and table working surfaces from 48 x 72 in. to 48 x 96 in. Maximum distance of the spindle sleeve to the tail block is 138 in.

Accessories include precision measuring devices for head and table movement, precision verniers, angular milling attachment, facing heads, auxiliary tables, rotary tables, and angle plates. *Write*: Portage Machine Co., 1049 Sweitzer Ave., Akron 11, Ohio. *Phone*: Blackstone 3-7191



Aluminum Melting Furnaces Eliminate Moisture and Hydrogen

This line of double chamber furnaces is of the reverberatory type. Gas, oil, or combination firing may be used.

The burners are mounted in the arch or roof and fire down into the melting and holding chambers. Pilots for the burners are located over and are integral with main burners so they cannot become clogged with dross.

High melting rates and uniform pouring temperatures are provided for diecasting, permanent mold, and sand casting work. Hourly capacities range from 300 to 2000 lb.

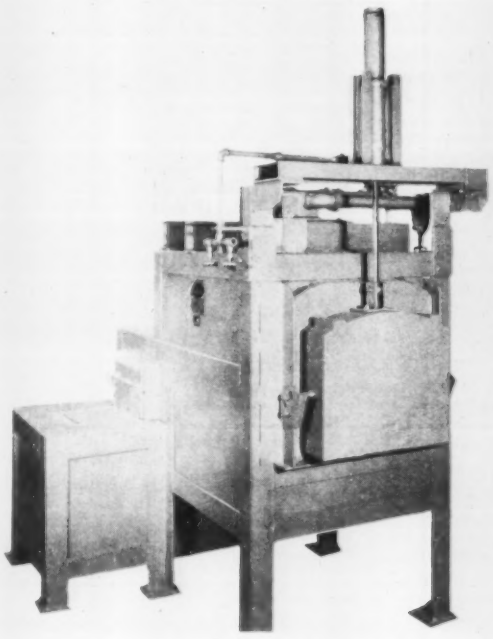
Because the furnaces can be provided with end, single side, or double side dipouts, they fit into a variety of production lines. Sixteen combinations of sizes and dipout arrangements are available.

Moisture cannot enter the molten metal in these furnaces because it is driven off while the metal is melting on the dry hearth. The moisture mixes with the products of combustion and leaves the furnace through the flue.

Hydrogen gas cannot get into the molten metal to produce porosity (the design prevents overheating).

The arch on the furnaces is separate from the rest of the unit. This design makes it easier and less costly to repair refractory, furnace walls, and hearth.

Aluminum melts quickly on the sloping hearth because of the top-firing design. It flows to the holding compartment and its temperature is controlled by instruments.



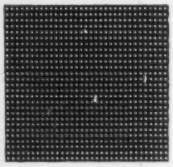
Oxide inclusions, normally found in scrap metal, are cleaned from the furnace by raking the hearth at the end of each day. *Write*: Industrial Furnace Div., Eclipse Fuel Engineering Co., Rockford, Ill. *Phone*: 8-3751

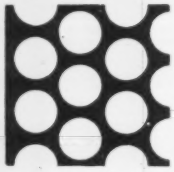
H&K PERFORATED MATERIALS

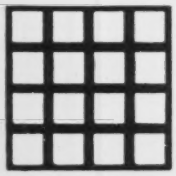
Utility • Beauty • Economy
FOR TOMORROW'S PRODUCTS

A MEDIUM OF LIMITLESS APPLICATIONS

Designers are discovering an ever-increasing range of applications for perforated materials. For functional or decorative purposes, or where a combination of both is essential, H & K perforated materials are used in more products, in more accessories, in more places than ever before.

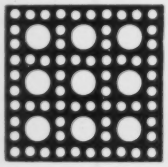






REDUCES TOOLING COSTS

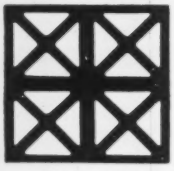
Design, pattern and open area for almost every application may be selected from our thousands of perforating dies—at no charge for tooling. (Tools for special designs can be built to order.)



MATERIALS PERFORATED

Harrington & King can perforate practically any metallic or non-metallic material that can be obtained in coils, sheets or plates . . . from foil-thin to 1" thick.

H & K engineers will be pleased to work with you on your requirements.



See our catalog in Sweet's Product Design File.

FIND NEAREST H&K AGENT in the Yellow Pages

Listed Under "Perforated Metals"

Fill in and mail coupon to the nearest H & K office.

THE Harrington & King PERFORATING CO. INC.

Chicago Office and Warehouse
5627 Fillmore Street
Chicago 44, Ill.

New York Office and Warehouse
118 Liberty Street
New York, N.Y.

Please send me—

☐ GENERAL CATALOG NO. 62
☐ STOCK LIST of Perforated Steel Sheets

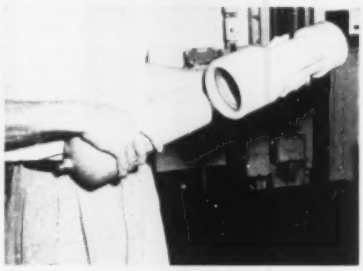
NAME_____
TITLE_____
COMPANY_____
STREET_____
CITY_____ ZONE_____ STATE_____

NEW PRODUCTS and equipment

Quick Coupling

Only seconds are needed to assemble or disassemble this coupling made of Koroseal polyvinyl chloride.

The coupling is recommended for temporary chemical, oil, water, or disposal lines. It will take up to 10 degrees of misalignment in pipe joints.



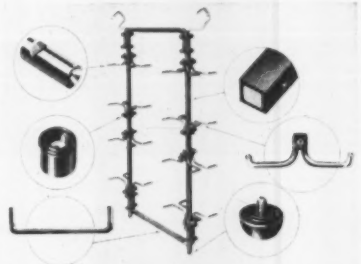
The pipe comes in 20 and 30 ft lengths of 2, 3, and 4-in. diameters. It is unaffected by most acids and alkalies as well as salt, oil, water, and alcohol solutions. *Write*: Plastic Div., B. F. Goodrich Industrial Products Co., Marietta, Ohio. *Phone*: Frontier 3-6611

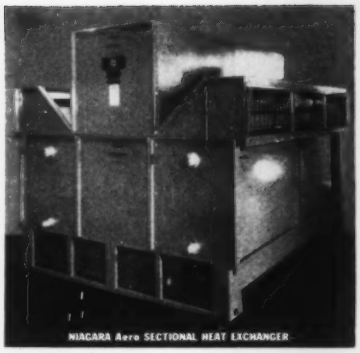
Plating Racks

This rack provides direct current conduction from the hook to the piece-holding member without resistance joints. All rubber-to-rubber joints of the assembled rack are sealed with two ribs, one concentric to the other.

Splines and other parts of the rack are completely covered before assembly with a molded thermosetting compound.

Holding members are designed for the pieces being plated. They are fabricated from spring rod or flat stock to allow the use of removable contact tips. The spring member is located with a stud and





NIAGARA SECTIONAL *Aero* HEAT EXCHANGER

gives close temperature control, saves you

LABOR, Power, Water

● You gain in accurate control of quench bath temperatures and quickly effective capacity to handle initial peak load of heat in quenching. You prevent production set-backs, increase the output of your heat treating department, prevent oil fires, save losses from rejected parts.

Niagara *Aero* Heat Exchangers give you this control in both furnace and induction hardening methods. They prevent both over-heating and over-cooling of the quench bath. Hundreds of heat treaters know they prevent many troubles, constantly improve quality and increase production.

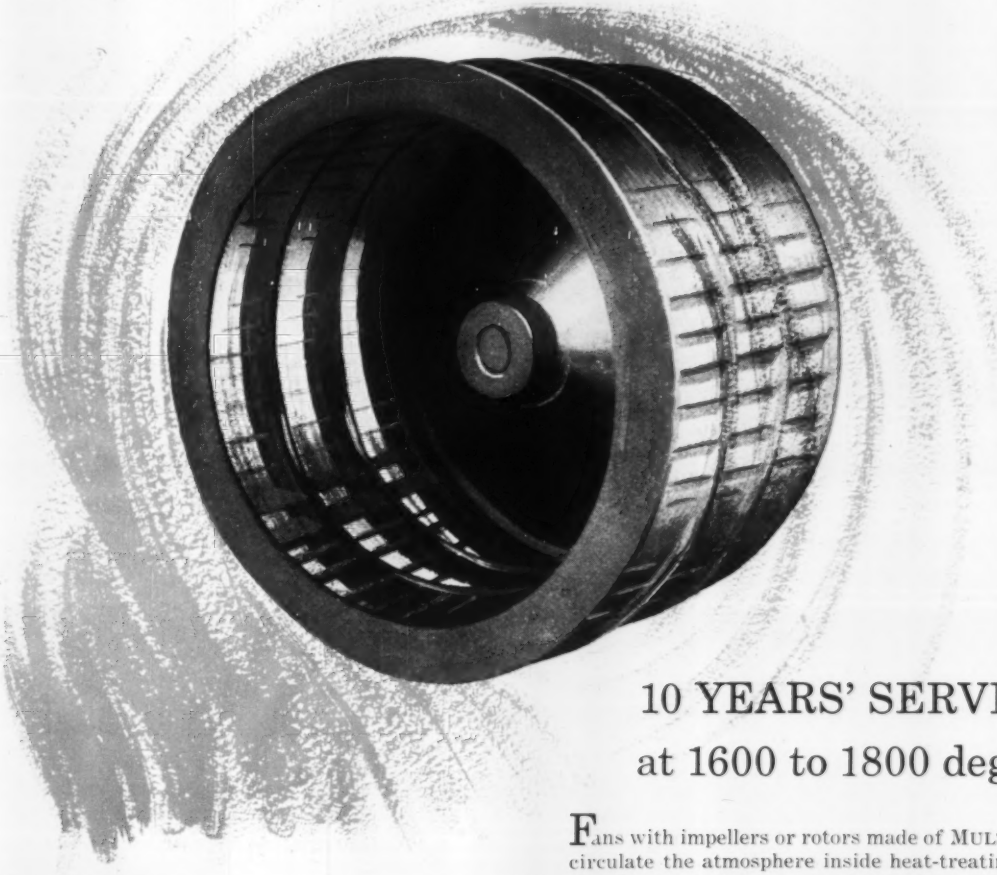
They quickly pay for themselves by saving cooling water coils and extend your quench capacity without extra water or cooling tower.

Use Niagara Aero Heat Exchangers also to cool and control temperature of furnace jackets, induction heaters, welders, wire drawing and extrusion dies, rolls, transformers, engines and all plant water cooling systems.

Write for Bulletins 120 and 132 giving complete information.

NIAGARA BLOWER COMPANY
Dept. S-9, 405 Lexington Ave.
NEW YORK 17, N. Y.
District Engineers in Principal Cities of U. S. and Canada

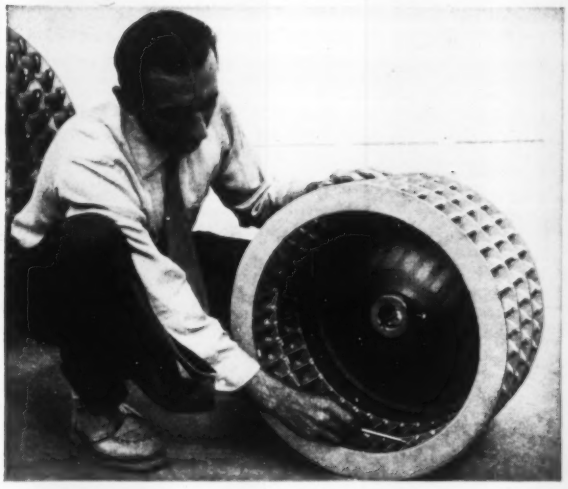
HAYNES Alloys solve the *tough* heat problems



10 YEARS' SERVICE at 1600 to 1800 deg. F.

Fans with impellers or rotors made of MULTIMET alloy circulate the atmosphere inside heat-treating furnaces and are exposed to temperatures from 1600 to 1800 deg. F. They withstand both reducing and oxidizing conditions produced during cyaniding, annealing, and nitriding operations. Their average life is about 10 years.

MULTIMET is one of 12 HAYNES alloys specifically designed for use where strength at high temperatures is essential. For details on properties, forms, and prices send for descriptive literature or contact our nearest sales office. HAYNES STELLITE COMPANY, Division of Union Carbide Corporation, General Offices and Works, Kokomo, Indiana. Sales Offices in Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, San Francisco.



Designed to operate at 1800 deg. F., this impeller has 180 blades formed from MULTIMET alloy sheet. Impellers range from 12 to 48 inches in diameter. Furnace rotors, cast of MULTIMET alloy, operate at temperatures up to 2100 deg. F.

HAYNES ALLOYS

HAYNES STELLITE COMPANY

Division of Union Carbide Corporation

Kokomo, Indiana

UNION CARBIDE

"Haynes," "Multimet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Reactor components, operating submerged in high-temperature and high-pressure radioactive water, are sealed in protective "cans" of *stainless steel.* Pile control rods, exposed to the same conditions, are clad with sleeves of *stainless steel* and are suspended by cables of *stainless steel.*

In any field — nucleonic, aviation, guided missile — where critical specifications *must* be met, Wallingford Steel can fill the need with stainless and super metal strip or tubing of extremely high quality, excellent corrosion resistance and low heat transfer rates.

Whether your need is quality stainless steel, or super metals with special characteristics, Wallingford Steel can help you. Write today.

Progress in Metals

for over 35 Years

THE
WALLINGFORD STEEL CO.
WALLINGFORD, CONN., U.S.A.

COLD ROLLED STRIP: *Super Metals, Stainless, Alloy*
WELDED TUBES AND PIPE: *Super Metals, Stainless*

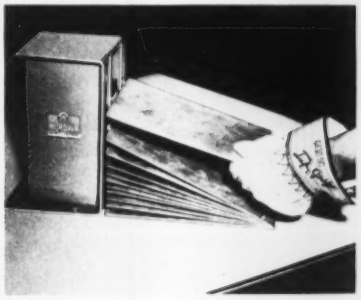
NEW PRODUCTS and equipment

can be replaced if necessary.

When models are changed, only new holding members for the new parts to be plated are needed. *Write*: Plating Equipment Div., Automotive Rubber Co. Inc., 12550 Beech Rd., Detroit 39, Mich. *Phone*: Kenwood 2-3000

Sheet Fanner

Models SF 10, 20, 30, and 40 are heavy duty units for the automatic separation of sheet or strip stock fed to presses, brakes, and other tools.



The units consist of Alnico V permanent magnets enclosed in a protecting cover. When placed adjacent to a stockpile of tin plate, sheets, or strip, the magnetic field induces like polarity in the stock, causing each to repel the other and to tend to rise in the air and maintain a definite separation.

The protective shell of the unit is made of aluminum. Wear strips of stainless steel on the face minimize frictional resistance to the elevation of stock and prevent scoring or tearing of the pieces.

A poured epoxy resin is used to fasten the magnetic castings. *Write*: Eriez Mfg. Co., Erie 6, Pa. *Phone*: 4-0133

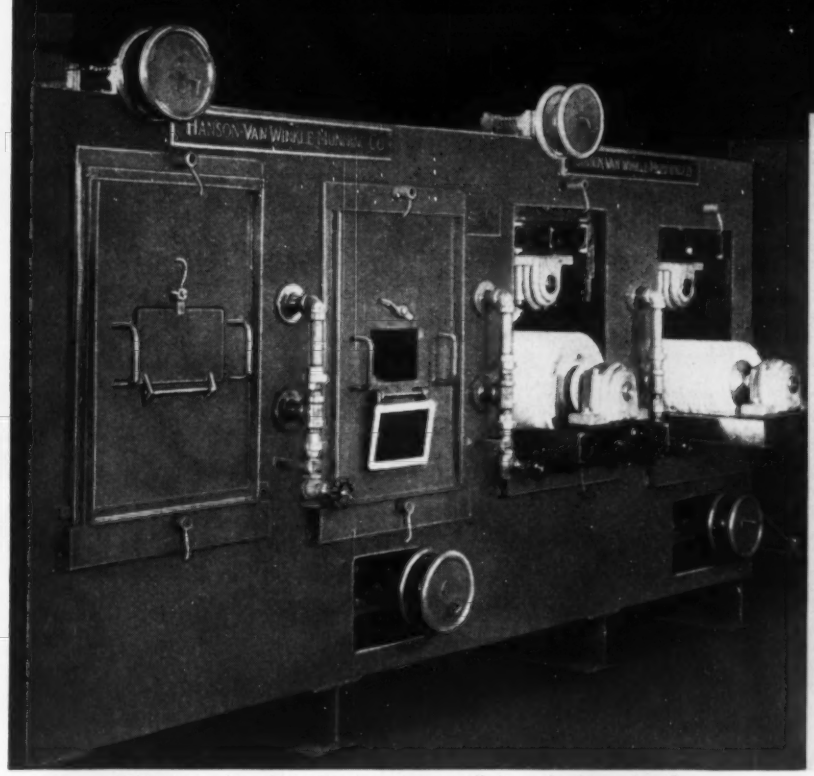
Embossing Presses

The line of Series 90 presses has models with capacities of 150 to 1000 tons. The presses are used in mass production coining, sizing, and embossing operations.

A combination air friction clutch and brake is located on the crankshaft within the main gear drive to increase single cycle efficiency.

The high press speeds give a greater velocity of impact which

CONTINUOUS STRIP AND SHEET METAL PROCESSORS



cut cleaning time to a fraction with this automatic H-VW-M SCRUBBER UNIT

H-VW-M Scrubber Unit. Brush units are pulled out for inspection. In a matter of minutes they could be replaced, if necessary with new brushes.

...and no down time either! Brushes are replaced easily while unit is in operation!

H-VW-M Scrubber Units—which adapt to fit into any system—are equipped with an exclusive, patented device that permits replacement of brushes *while the unit is running.* Just turn a few bolts, slide worn brush out, and insert replacement. Not a moment's production time is lost!

Add the advantages of this remarkable new feature to the enormous savings you'll realize in cleaning, reworking and inspection time, and you'll see why the rugged, efficient H-VW-M Scrubber Unit has no equal. 3149

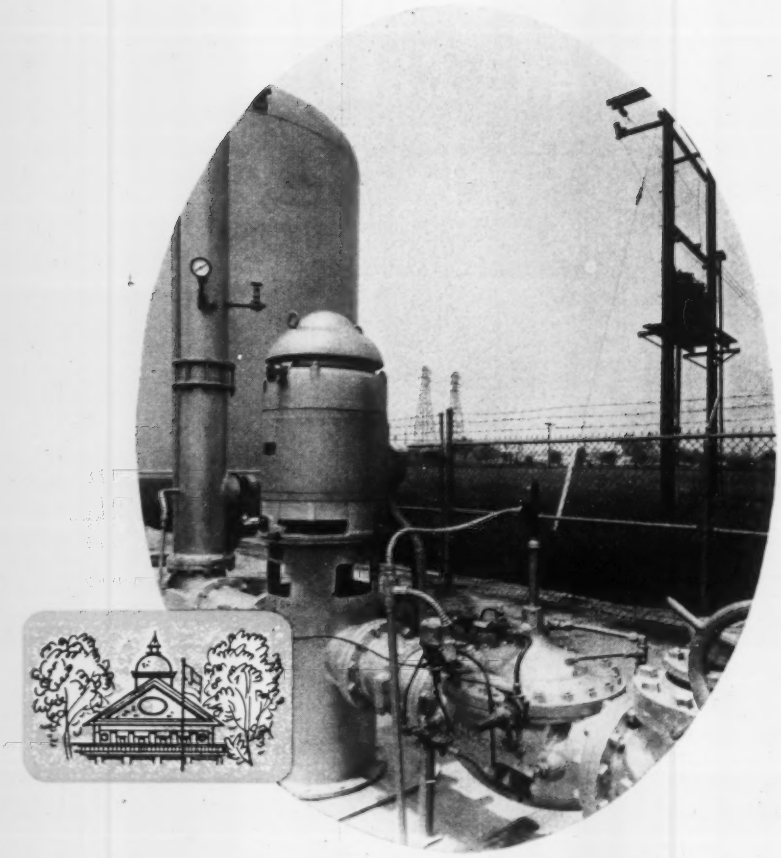
Get more facts about H-VW-M Scrubbers, with their exclusive easy-brush-replacement feature, by writing today for Bulletin HB-100.

Hanson-Van Winkle-Munning Co., Matawan, New Jersey. Offices in principal cities.

H-VW-M

PLATEMANSHIP —Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

Hanson-Van Winkle-Munning Company, Matawan, New Jersey. Offices in principal cities.



Verti-Line®

BOOSTER PUMPS

in

WATER SYSTEM

This Suction-Cased Booster Pump is one of two Verti-Line units maintaining pressure in a large water system.

It is a 60 HP pump, handling 1,000 GPM against 170 feet head. Installed in August 1953, it has proven highly satisfactory in performance – and has cut maintenance expense to the bone.

Over 100,000 satisfied vertical pump users agree there's no pump like Verti-Line for low first cost, economical operation, and negligible maintenance.

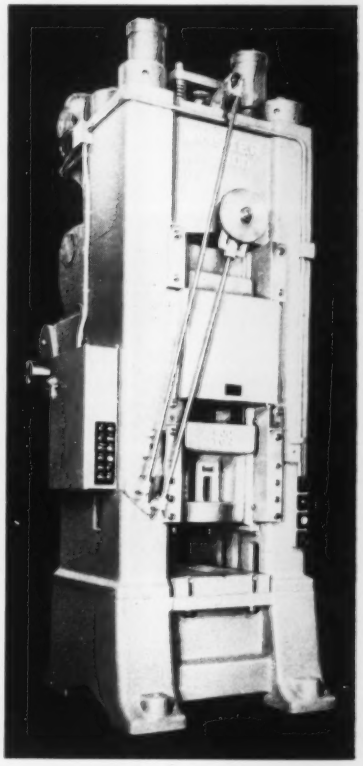
Send for new brochure "PUMPS FOR SALE" Ask for Bulletin J-97

IF YOUR NEEDS INCLUDE BOOSTER PUMPS, IT WILL PAY YOU TO INVESTIGATE VERTI-LINE BEFORE YOU BUY.

Verti-Line Pumps are exclusive products of

LAYNE & BOWLER PUMP COMPANY
general offices & main plant
2943 VAIL AVENUE • LOS ANGELES 22, CALIFORNIA

NEW PRODUCTS and equipment



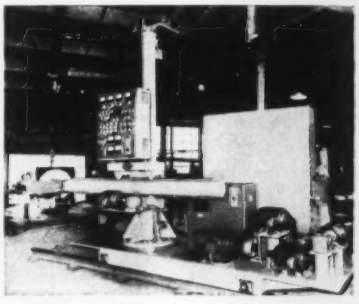
tends to increase the flow of metal in cavity type dies or sizing operations.

A recirculating oil lubrication system supplies oil under pressure to instantly replenish oil film on all wear surfaces after every stroke. *Write*: Minster Machine Co., Minster, Ohio.

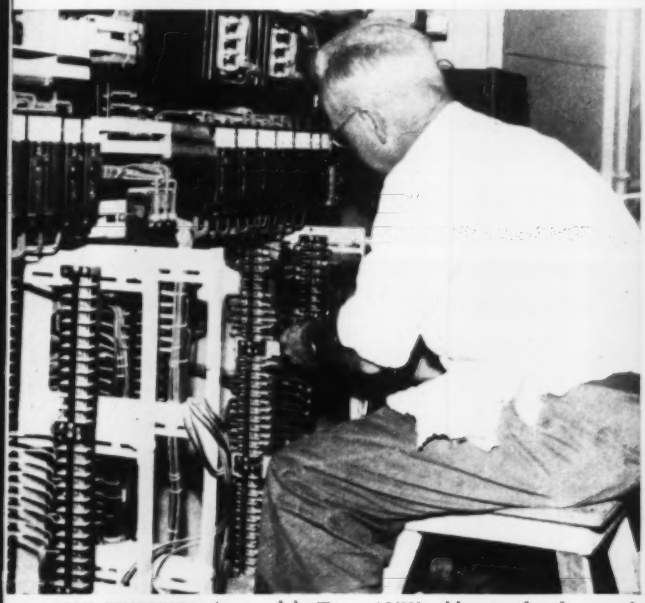
Welding Manipulator

This ram-type manipulator has twin heads. They can be controlled independently or simultaneously.

Ram travel speeds (from 5 to 100 ipm) are electronically controlled. The carriage has three



Whatever you want in control cable—Anaconda has it!



PEAK RELIABILITY. Anaconda's Type ANW-rubber-insulated control cable is a high-quality product which features unusual heat resistance. It is also highly resistant to attack by moisture, acids, alkalies and other chemicals. Individual conductor covering and over-all jacket of neoprene.

MULTIPLE USE. Anaconda thermoplastic control cables can be installed aerially, in conduit, underground in ducts—or buried directly in the earth. They are available with either polyethylene (600 or 1000 volts) or Densheath* vinyl resin (600 volts) insulation and Densheath over-all jacket. Also with Densheath conductor covers on request.

OZONE-RESISTANCE. For station control applications where ozone conditions prevail, Anaconda offers a special low-voltage butyl-insulated cable. This control cable not only resists ozone, but individual conductor covering and over-all jacket of neoprene provide maximum insurance against moisture and mechanical injury.

SPACE-SAVER. You can install a 12-conductor cable in conduit now carrying a 6 or 7—with Anaconda Type PND† Control Cable. Individual conductor coverings of moisture-, oil- and gasoline-resistant nylon. Over-all Densheath jacket. Designed for general-purpose control requirements where space is a limiting factor.

Permanent Full Color Coding on rubber cables, by means of Anaconda's rubber-base coating, assures quick and positive circuit identification. Coding by surface printing, which conforms to IPCEA standards, also available. On thermoplastic cables, full color coding with pigmented insulation and surface printed coding are likewise offered. For information on any of Anaconda's Control Cables—including cables engineered for more specialized control requirements—see your Anaconda distributor or the Man from Anaconda. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

*Reg. U.S. Pat. Off. 57380
†Trademark

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RUST PREVENTIVES

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Valvoline Tectyl Rust Preventives save money, time and worry.

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Please rush my copy of your newest booklet entitled, "The Key to Rust Prevention," which tells about the problems of rust, cleaning my products, materials in corrosion preventives and how to choose a rust preventive.

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City ..... Zone ..... State .....

NEW PRODUCTS and equipment

forward speed ranges and a rapid traverse (300 ipm).

Column and ram rotate 360 degrees within the base and may be locked at any position. *Write*: C. B. Herrick Mfg. Corp., 2000 Center St., Cleveland 13, Ohio. *Phone*: Cherry 1-6185

Contour Polishing

This mushroom shaped, molded rubber pad and coated abrasive discs combine to do grinding or polishing of small radiuses or difficult contours.

Swirl marks and gouges are virtually eliminated, so that the usual subsequent finishing operation often can be eliminated.

No center nut is used to fasten the discs to the pad. Instead, the discs are held by a special adhesive packaged in tube applicators.

The discs are made with an aluminum oxide abrasive with an all-resin bond. Grits: 120-X, 80-X, 50-X. *Write*: Behr-Manning Co., division of Norton Co., Troy, N. Y. *Phone*: Arsenal 3-0100

Self-Locking Bolt

The Nylok bolt locks wherever wrenching is stopped. It is vibration-proof, liquid tight and adjustable.

A nylon plug in the side of the bolt wedges opposite mating threads together, and locks whether or not the bolt has been seated.

When properly seated, the nylon

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NEW PRODUCTS and equipment

plug blocks fluid flow around the helix of the threads. The plug is resistant to moisture and ordinary solvents. It provides a permanent seal.

The bolt can be backed off and wrenched tight repeatedly without damage to the threads, seating surfaces, or holding power.

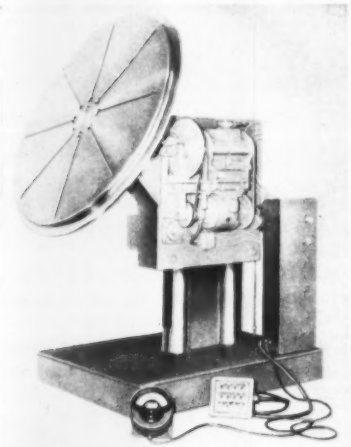
Available sizes: No. 1 to 1 in. diam. *Write*: Bolt & Chain Div., Republic Steel Corp., 1970 Carter Rd., Cleveland 13, Ohio. *Phone*: Tower 1-7500

Titanium Positioner

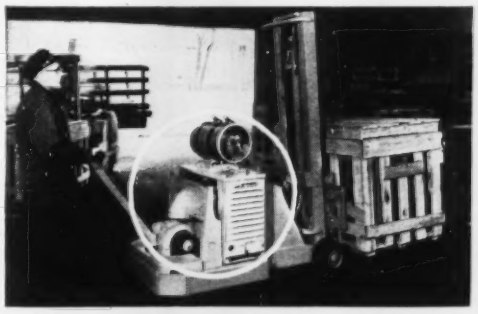
Model 21TS is an automatic positioner used with production processes for welding titanium.

A 64-in. diameter seal plate allows a plastic gastight dome to be placed over the table and workpiece.

Load capacity is 5000 lb with the

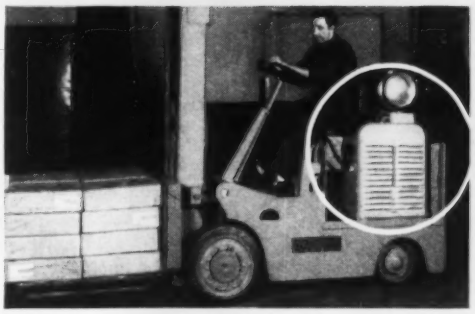


Get the Advantages of READY-POWER on Your Electric Industrial Trucks



Get Live Power for Walkie Trucks

Ready-Power's popular bantam model "W" is equipped with dependable 12-volt automotive-type starting and ignition. Variety of idling speeds and easy accessibility make it ideal for all walkie trucks as well as rider trucks up to 2,000 lbs.

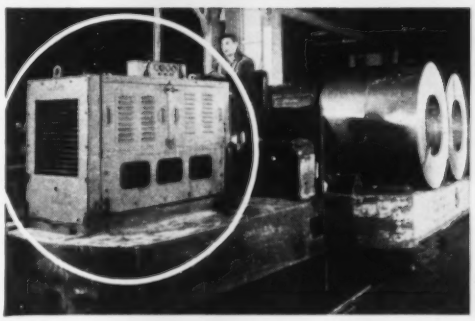


Work Your Fork, Platform, Tractor Trucks 'Round the Clock

Ready-Power gas-electric and LPG-electric units give materials handling trucks continuous, full power all the time. Slowdowns due to power fatigue are eliminated. The simple, all-electric control and live response make Ready-Power-equipped trucks rate high with truck operators.

Energize Lift Magnets on Your Electric Trucks

In the application shown at the left, the Ready-Power unit not only powers the truck, but also energizes the lift magnet for handling scrap metal. Ready-Power units are removable for shop adjustment while a spare keeps trucks working.



Get Diesel Electric for Lowest Ton-Mile Costs

Take a tip from the owners of industry's biggest trucks . . . power them with Ready-Power diesel-electric for maximum stamina, dependability, and lowest operating costs. Ready-Power offers power for every size and make of electric truck.

Your Truck is No Better than its Power . . . Write for Information on Ready-Power gas-electric, LPG-electric, and Diesel-electric Units

READY-POWER

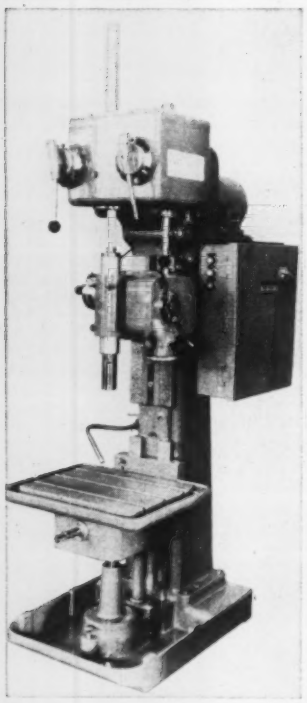
The READY-POWER Co., 3824 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

center of gravity 6 in. above the table and 4 in. offcenter. Rotation torque: 20,000 in.-lb. *Write*: Aronson Machine Co., Arcade, N. Y.

Tapping Machine

Model N is an upright drilling and tapping unit with a 21-in. swing. It is made in box and round column types in single spindle models and gang drills.

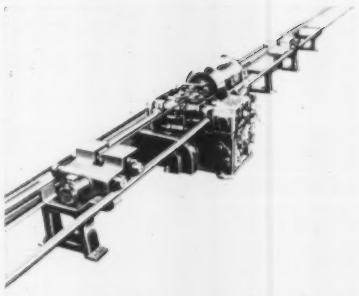


Unlimited feed rates are possible, and standard geared tap leads (8 to 50 pitch) are provided. *Write*: Cleereman Machine Tool Corp., 555 W. Washington Blvd., Chicago 6, Ill. *Phone*: Dearborn 2-5566

Bar Turning Machine

This centerless machine changes over from rough to finish turning simply by changing cutter heads. It turns ferrous and nonferrous bars, including titanium and uranium.

Quality tolerances are ±0.00025 in. and maximum limit of diameter variation is ±0.001 in. on a 20-ft



length of precision turned bars. *Write*: Sutton Engineering Co., First National Bank Bldg., Pittsburgh 22, Pa. *Phone*: Grant 1-8077

Fractional Motors

The Form G line of motors is suited for severe applications. The single and three-phase motors have ratings of 1/6 to ¾ hp and speeds of 1140, 1725, and 3450 rpm.

Stator windings are protected by special insulation and double varnish impregnation. The motors are totally enclosed, and have corrosion resistant finish on both internal and external surfaces.

Other features: Base welded to the stator shell, stainless steel shaft, cast iron end shields, nonventilated construction. *Write*: General Purpose Motor Dept., General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Automatic Grease Cup

Burned out machinery from too little grease or damaged bearing seals and equipment from too much grease are eliminated by the Visiball.

The heart of the grease cup is a neoprene disc which inflates into a ball holding up to 2 ounces of grease. It is filled with a standard grease gun through a fitting on the side of the chrome plated zinc housing.

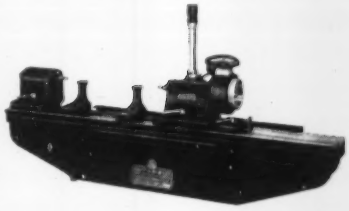
A clear lucite plastic cylinder protects the neoprene ball and enables the maintenance man to see the ball as it fills with grease.

The ball deflates as the bearing uses grease. It is not necessary to refill the cup until the neoprene disc returns to the deflated position.

The compression of the neoprene ball and the vacuum created by the

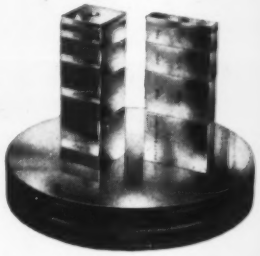
(Advertisement)

Basic Equipment for Higher Precision



P & W STANDARD MEASURING MACHINE

. . . is used throughout industry to measure gages, tools and finished products for diameter, length, roundness, straightness, parallelism and taper direct to .00001" with controlled measuring pressure.



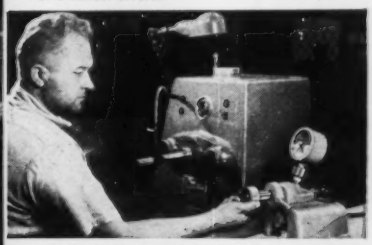
P & W PRECISION GAGE BLOCKS . . . are the basic standards of precision in thousands of plants. Guaranteed for size, parallelism and flatness within a few millionths of an inch. HOKE Blocks (square type) and USA Blocks (rectangular type) are available in steel or solid carbide.

P & W ELECTROLIMIT MILLIONTH COMPARATOR

. . . was developed by Pratt & Whitney for checking Precision Gage Blocks to a millionth of an inch. An essential item of basic measuring equipment for every plant that must establish and maintain truly high master standards of accuracy.

SUPERMICROMETER . . . reads directly to .0001" (.001 mm, if metric). Controlled measuring pressure eliminates operator's errors. Ideal for daily use at machine or on inspection bench.

ELECTROLIMIT COMPARATORS . . . for the ultimate in gaging accuracy. Magnifications up to 110,000 times insure accurate indication of smallest errors.

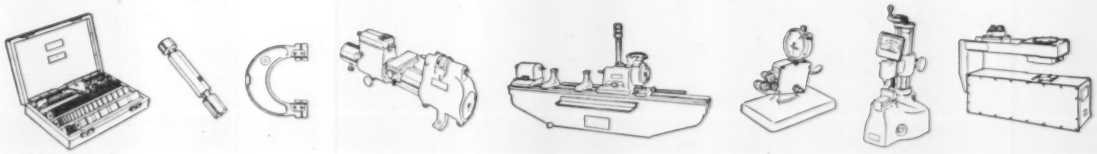


AIR-O-LIMIT COMPARATORS . . . are extremely versatile, check a wide range of products. Readily engineered to your specific requirements.

ELECTROLIMIT SUPERMICROMETER . . . reads direct to .00002" when used as a comparator. Tells operator at a glance exactly how much a part is over or under the required dimension

Improve Your Quality and Reduce Your Inspection Costs

PRATT & WHITNEY GAGES AND COMPARATORS . . . are available for practically every need and every product. In this complete line, you will find the right gage for use at the machine, on the bench or in the inspection room. You will find that these P&W Gages and Comparators make it possible for you to establish and maintain higher, more dependable standards of product precision and quality and — in addition — will help you reduce your inspection time and costs to a minimum. Write now for complete information, outlining your quality control needs. Pratt & Whitney Company, Incorporated, *13* Charter Oak Boulevard, West Hartford, Conn.



GAGE BLOCKS . . . CONVENTIONAL GAGES . . . SUPERMICROMETERS . . . STANDARD MEASURING MACHINES . . . COMPARATORS . . . AUTOMATION AND CONTINUOUS GAGES

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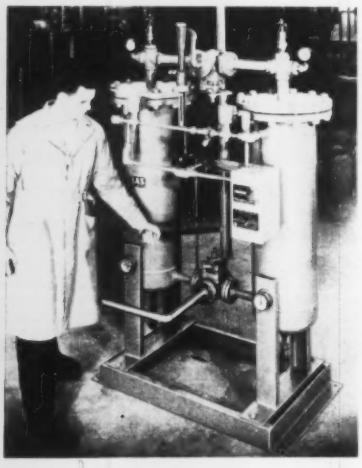
motion of the shaft cause grease to feed automatically into the bearing as it is needed. *Write*: Visiball Mfg. Co., P.O. Box 7021, Ft. Worth, Tex.

Dehydrators

Instrument air and process gas are dried by this line of steam-reactivated dehydrators. There are 11 models which handle from 10 to 1000 cfm (air at 70° F and 100 psig) in continuous operation with manual, semiautomatic, or automatic cycling.

Desiccant changes and other maintenance can be performed without disturbing the steam coil. *Write*: Selas Corp. of America, Dresher, Pa. *Phone*: Mitchell 6-6600



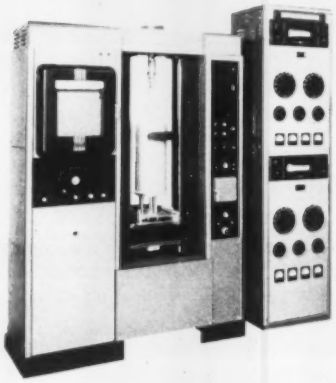
High Speed Belt

Rusco Ultra-Speed M is a flexible transmission belt that can operate at any speed (up to 100,000 rpm and above) over pulleys as small as $\frac{3}{8}$ in. in diameter.

The thin, flat belt is a blend of strong, stretch-resistant synthetic and natural fibers bonded together. *Write*: Russell Mfg. Co., 460 E. Main St., Middletown, Conn. *Phone*: Diamond 6-7866

Tensile Tester

This equipment can be used for tensile testing at temperatures up to 2200° F. More than 1500 lb of tensile force can be exerted at that temperature. A controller panel regulates temperatures within the furnace to ±2° F.



A dual furnace arrangement makes testing faster and more versatile. *Write*: Instron Engineering Corp., 440 Hancock St., North Quincy, Mass. *Phone*: Mayflower 9-7500

Deburring Machine

This vertical machine can deburr both sides of holes in flat and thin sections.

After the top spindle deburrs one side, it retracts and the bottom spindle deburrs the other side.

On thicker sections, both spindles deburr at the same time. The machine is controlled by foot so

OTHER
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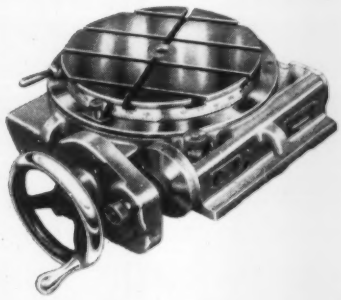
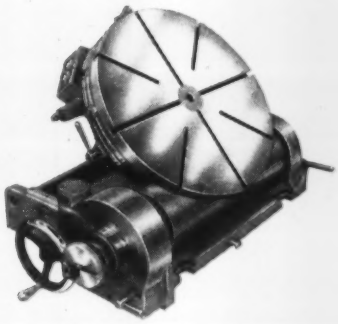
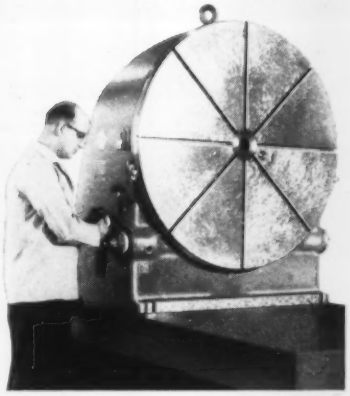
PRECISION
ROTARY TABLES



PLAIN . . . in 12" to 50"
12" and 20" diameter hand-operated and 24", 30", 42" and 50" diameter motor driven models. Also available in 42" tables with automatic indexing or with P&W Numerical Control.



TILTING . . . in 10" to 36"
10" and 16" diameter hand-operated and 24"and 36" diameter power-rotated models.



VERTICAL . . . in 30" and 48"
diameters, motor-driven.

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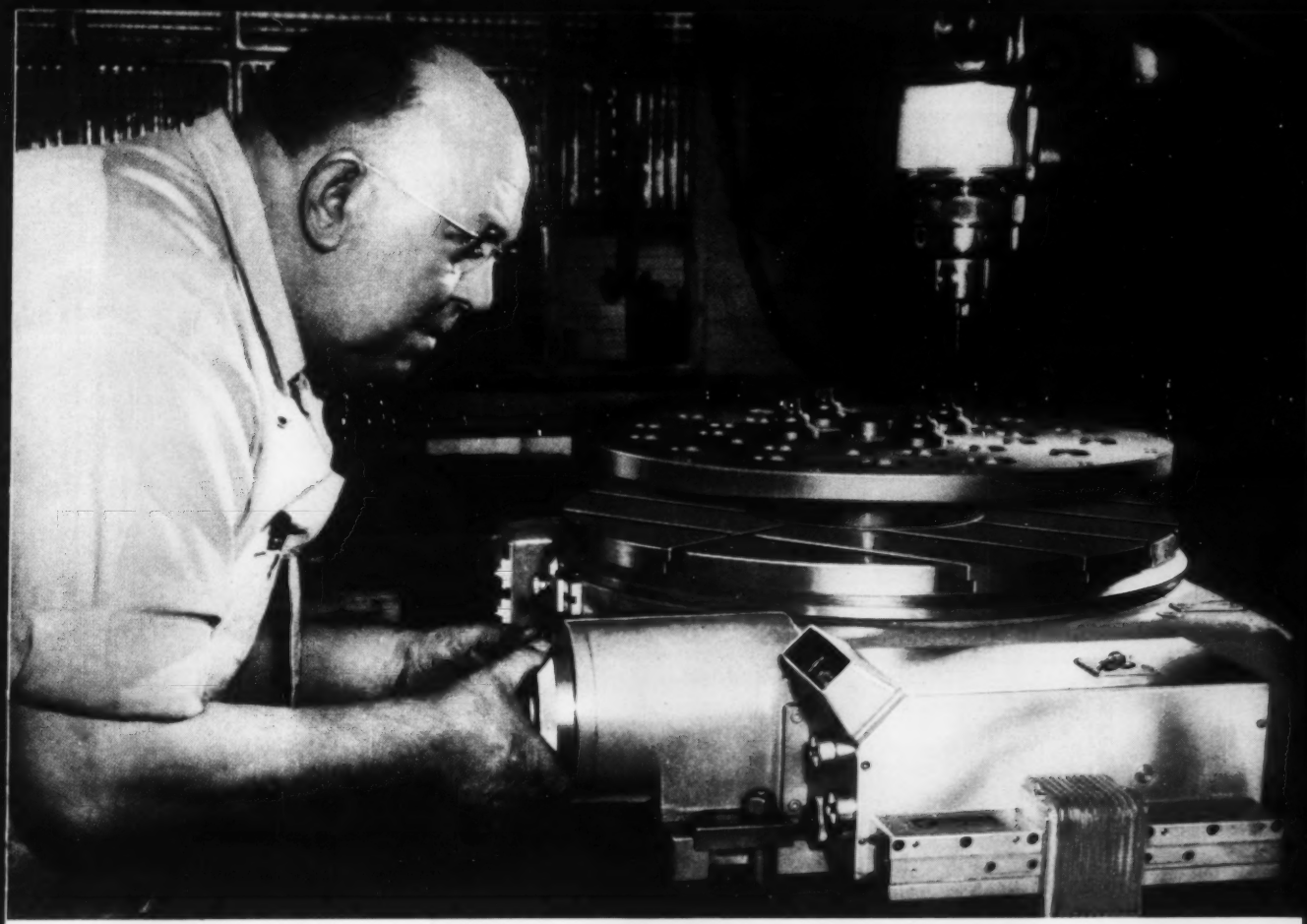


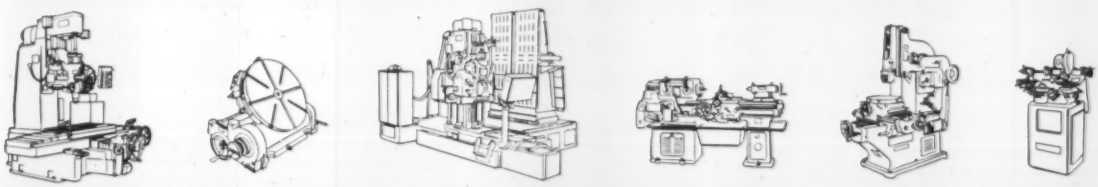
Here's how one company IMPROVED PRODUCT PRECISION and PERFORMANCE

WITH A PRATT & WHITNEY OPTICAL ROTARY TABLE

The high-precision special machines manufactured by the Bodine Corporation of Bridgeport, Connecticut are used throughout the mass-producing industries to process small parts. The heart of every Bodine machine is the "dial" which requires from 20 to 200 accurately bored holes arranged in from 10 to 36 stations. To improve the precision of this critical component, the Bodine Corporation recently purchased a new Pratt & Whitney 24" Optical Rotary Table. As a result, tolerance between stations on the dial has been cut from 15 seconds of arc down to just 3 seconds and, as a spokesman for Bodine Corporation has stated, ". . . the improved efficiency of our product is obvious!" In addition to this table's greater accuracy, Bodine also likes the easy-to-read optical screen that cuts down on operator fatigue and the fact that constant use produces absolutely no error from wear.

If any of your own machining, inspecting or calibrating operations require extremely accurate circular spacing or angular positioning, it is more than likely that a Pratt & Whitney Optical Rotary Table can help you improve your product's precision and performance.

Write now for complete information.
Pratt & Whitney Company, Incorporated
13 Charter Oak Boulevard, West Hartford, Conn.



JIG BORERS . . . ROTARY TABLES . . . KELLER MACHINES . . . LATHES . . . VERTICAL SHAPERS . . . CUTTER AND RADIUS GRINDERS

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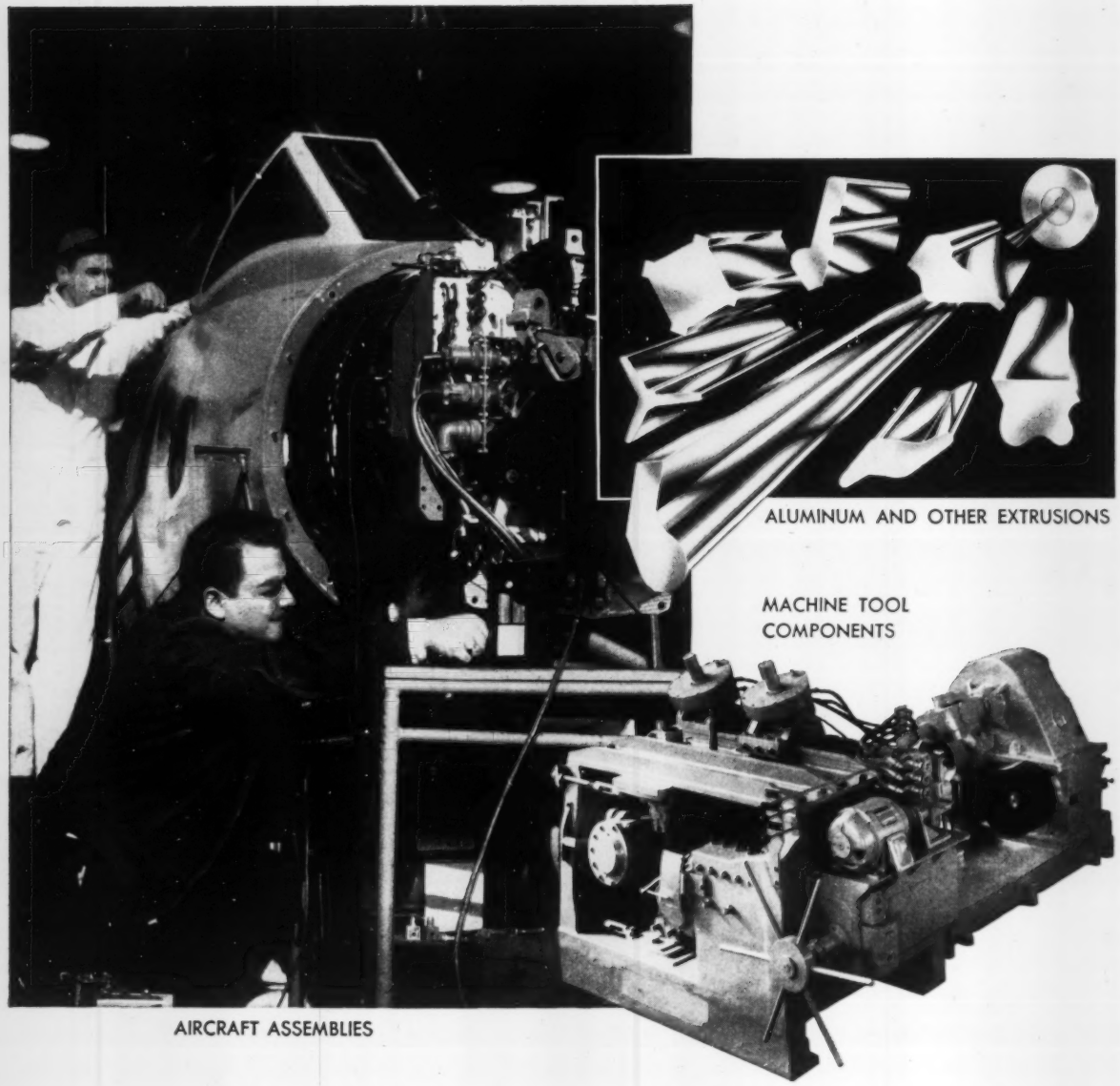

Before they fly, shape, form... Columbia-Southern Trichlor cleans them

Different parts, assemblies, units have one common problem: effective, thorough cleaning at low unit cost. The increasingly popular answer in metals plants of all types . . . vapor degreasing with Columbia-Southern Trichlorethylene.

Modern work flow planning calls for more frequent cleaning of materials during processing. Chips, grinding and buffing compounds, graphite, grease, coolants, quenching and lubricating oils—thorough removal of contaminants like these between operations holds rejects down. Nothing removes residues like vapor degreasing with the *right* solvent.

Columbia-Southern Trichlor works better because of its exclusively developed neutral stabilizer. Users find that pH stays high for extremely long periods. There's less cleanout, much longer running time before fresh solvent is needed. Made to rigid standards of quality by one of the world's leading merchant producers of chlorine, Columbia-Southern Trichlor is uniformly pure, drum by drum and tank car by tank car.

Try this fine trichlorethylene and note the drop in rejects, whether you're cleaning steel, aluminum, magnesium or any other metal. Order today from the nearest Columbia-Southern District Sales Office or from your regular solvents distributor.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

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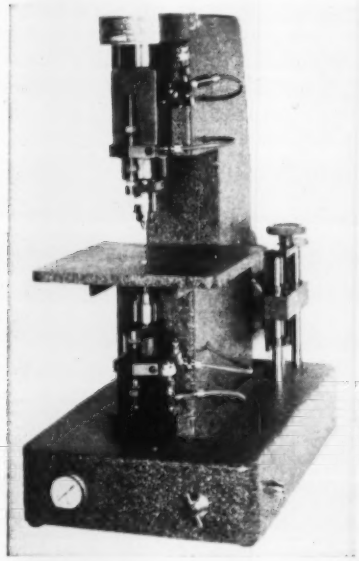
NEW PRODUCTS and equipment



that both hands are free to handle the work.

The machine is air operated through double acting cylinders. *Write*: Model Machine Co. Inc., 4729 Hawthorne St., Philadelphia 24, Pa. *Phone*: Cumberland 8-4565

Open Hearth Frames

The design of these frames permits a concentration of water at critical burnout points, particularly at the 9-in. arch areas. Twin arch frames give added strength. Door guides are water cooled.

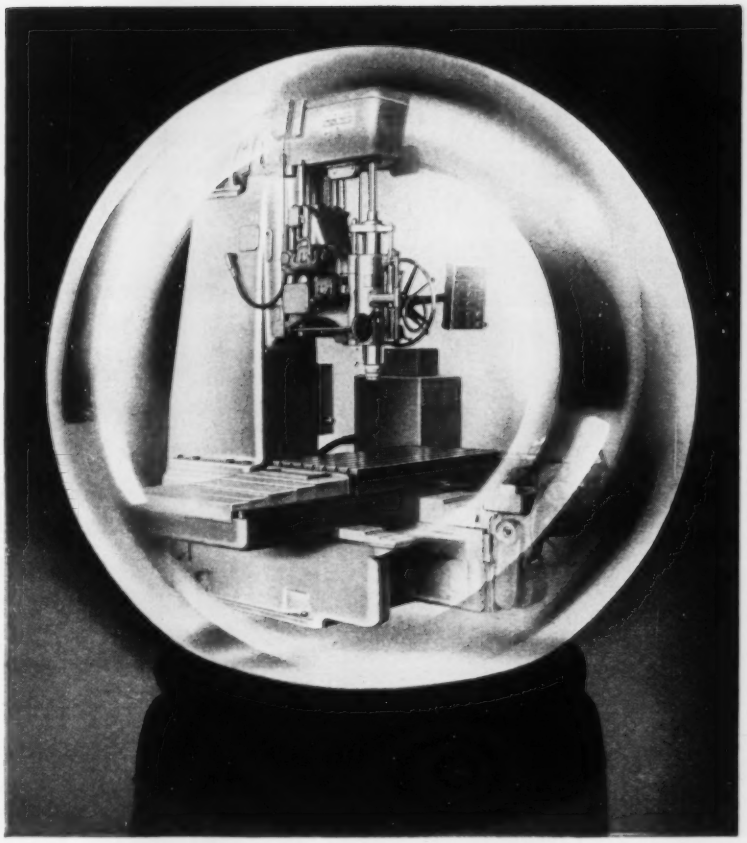
Doors are also water cooled. A deep refractory lining is held in placed by studs. The studs burn down with the refractory material and are easily replaced when a new lining is inset in the door. *Write*: Hutton Fabricating Mfg. Corp., 2736 E. 79th St., Cleveland 4, Ohio. *Phone*: Express 1-7432

Booster Pump

The B-12 produces pumping speeds between 5200 and 6000 cfm at pressures from 0.8 to 5 microns of mercury. Inlet diameter is 12 in.

A forepressure tolerance of 900 microns makes the booster useful for installation in series with high vacuum diffusion pumps.

The unit has a stainless steel body and external cooling coils. It is 50 in. high and requires a pro-



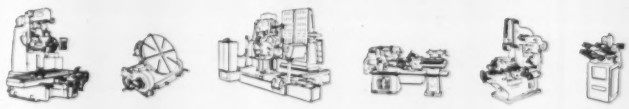
HOW TO FORECAST TOMORROW'S PROFITS

. . . AND MAKE THE FORECASTS COME TRUE WITH OUR EXTENDED PAYMENT PLAN!

You *don't* need a crystal ball for a look at tomorrow's profits. Just take an appraising look at your present machine tools and other plant equipment. The *only* way you can improve your competitive position and increase your profit margin is to reduce your production costs. If your present machines aren't up-to-the-minute . . . with everything it takes to produce faster, more efficiently and economically . . . you *can't* expect a bright profit future. To insure tomorrow's profits, you must invest *now* in the latest and finest.

The new Pratt & Whitney Extended Payment Plan makes it *easy* for you to replace immediately with new P&W Machine Tools. Your new profits will more than take care of the convenient installments that pay for the machines.

Write now for your copy of the booklet *"New Machines Make New Profits." Pratt & Whitney Company, Incorporated, 13 Charter Oak Boulevard, West Hartford, Conn.*



JIG BORERS • ROTARY TABLES • KELLER MACHINES • TOOLROOM LATHES • VERTICAL SHAPERS • CUTTER AND RADIUS GRINDERS

PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

WIRE

BACKED BY A HALF CENTURY OF EXPERIENCE

- **Sizes up to 9/16"...**

  . . . down to almost the size of a human hair, in low carbon and medium low carbon steels.

- **Wire of many finishes**

  the right wire for the job—coppered, tinned, bright, galvanized and other finishes to fit your production needs.

- **Better forming and workability**

  Continental Wire is available in almost any temper and analysis in low and medium low carbon steels for your particular forming jobs.

- **Metallurgical service**

  Thousands of case histories provide unsurpassed resources for developing a practical solution to your wire problems.

ECONO-COIL—Reduces scrap loss up to 90 percent. Saves material handling time. The Econo-Coil gives you continuous length wire coils of 2000# to 3000# catchweight, in sizes from 12 gage through ½" diameter. Shipped on returnable Econo-Coil pallets.

LEVERPAK—Mechanizes your wire handling, protects wire against moisture, dirt and handling damage. LEVERPAK permits long uninterrupted runs of 500# to 650#, depending on wire sizes. Saves scrap, downtime, stores easily.

SPECIAL SHAPES—D-shaped, V-shaped, oval, half-oval, half-round, square, rectangular, triangular, keystone-shaped and others. Saves fabricating and machining costs.

Chances are you have a problem right now that we can help you solve—with Wire. Call us.

CONTINENTAL

STEEL CORPORATION • KOKOMO, INDIANA

Wire Specialists for over Half a Century

PRODUCERS OF Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence, and other products.

jected floor space of 20 x 30 in. *Write*: NRC Equipment Corp., 160 Charlemont St., Newton Highlands 61, Mass. *Phone*: Decatur 2-5800

Scrap Cutter

Slitting and coiling lines, pickle lines, pickle line trimmers, and other trimming operations use this laterally adjustable cutter to increase the time between knife changes.

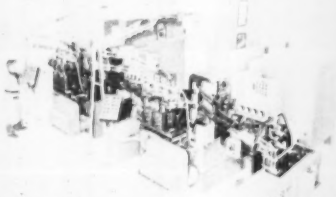
The knives are the four-edge type made up in small length multipies.

Scrap cutters for 48 in. and wider lines have dual drives which use a single, fixed knife holder over the entire length and two separate revolving knife holders, each with its own drive. *Write*: Stamco Inc., 125 S. Herman, New Bremen, Ohio. *Phone*: 2061

Boring Machines

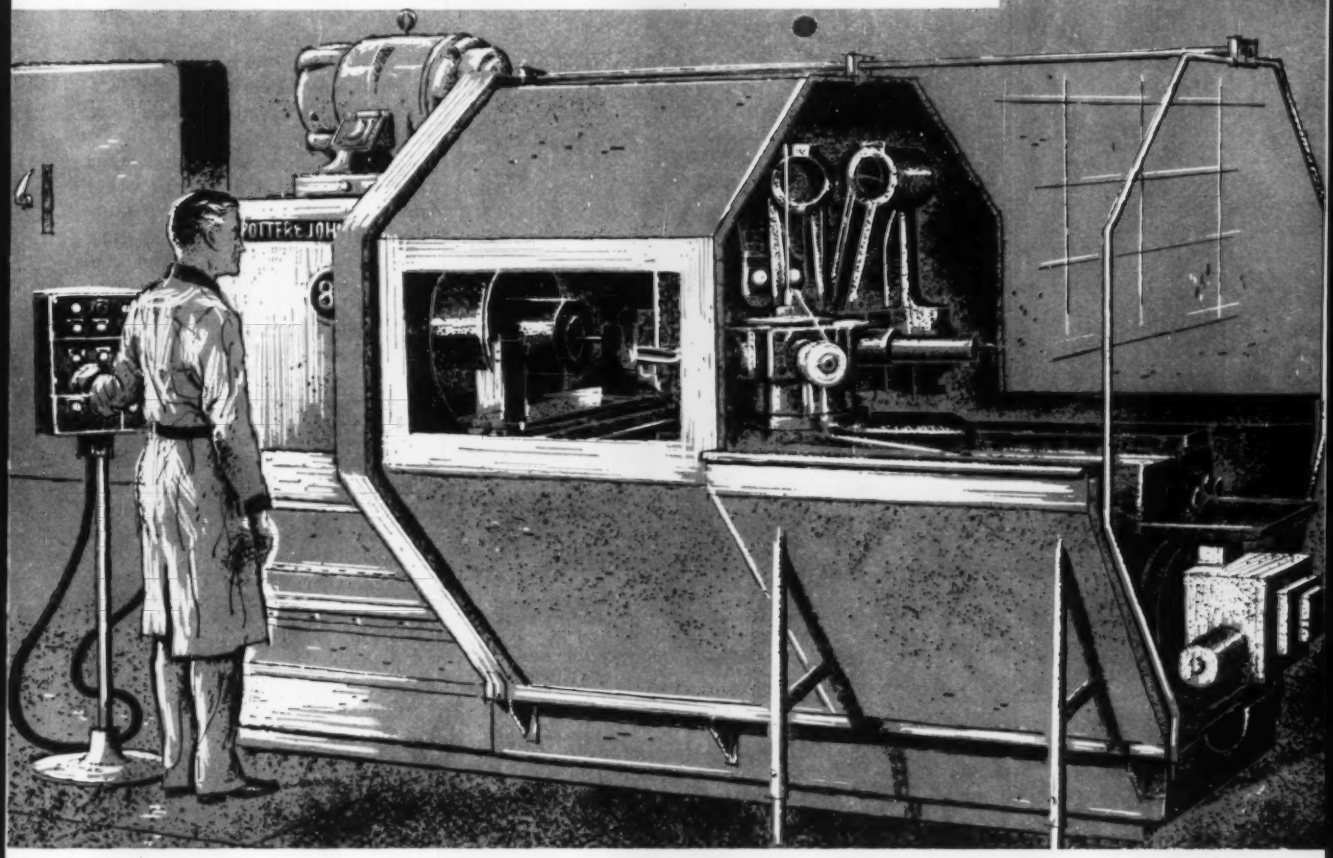
Two standard cam-operated borers are used in an automation line set up for making steel gears.

The borers handle the work automatically and have automatic tool adjustment controlled by air gages to compensate for tool wear.



Parts are gaged before and after each operation. The first gaging prevents oversize parts from entering the machine. The entire blanks are finished before cutting the gear teeth. The two machines bore the inside diameter, turn the outside

*Here it is . . . . the machine industry's been asking for !**



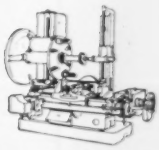
THE NEW P&J 8-U

AUTOMATIC Turret Lathe

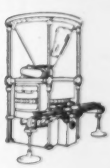
***A MACHINE TO FILL THE GAP BETWEEN OUR 6 DREL-40 AND 10-U**

Here is a new automatic with the extra power, rigidity and capacity you may be looking for. It's designed and engineered to handle your really big, hard-to-machine jobs faster, better and more economically than ever before. It will hog out tough alloys in a hurry, hold close tolerances and produce fine finishes with speed and efficiency. The 8-U with 50 hp, 30″ chuck and 40″ swing is intermediate in size between our 6 DREL-40 and 10-U. Take a minute now to write for specification circular and see how the new P&J 8-U fits into your production schedules.
Potter & Johnston Company, Pawtucket, Rhode Island.

AUTOMATIC TURRET LATHES



GEAR CUTTERS



GILDA PACKAGING MACHINES

POTTER & JOHNSTON

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INC.

PRECISION PRODUCTION TOOLING SINCE 1898

Foldability of Peterson Folda Products Depends Upon Quality Townsend Fasteners

The popular size twin stroller, only stroller with side-by-side seating which will go through standard doorways, being assembled on A. E. Peterson production line.

The extensive line of Folda products produced by A. E. Peterson Manufacturing Company, Glendale, California is designed for baby's safety and comfort—for mother's ease of handling. For instance, she has a choice of ten types and models of strollers.

In designing these unique folding walkers, strollers, chairs, swings, seats and steps, Peterson engineers also had quick, secure, efficient production line assembly in mind. That's why they chose Townsend Company special cold-formed parts, tubular rivets and tapping screws to do the fastening job.

Townsend special parts are used to attach the front wheels, casters and axles. Townsend standard and special tubular rivets are used at all pivot points—the important feature which permits folding for easy storage and handling of their products. Townsend tapping screws are used to attach arm rests and other non-removable parts.

Peterson officials give credit to dimensionally perfect Townsend parts for the permanent fastening they accomplish which has done much to establish their reputation for quality.

In your assembly operations why not take advantage of Townsend's experience in designing and manufacturing special and standard fasteners for a multitude of uses in all industry. To learn more about how to increase fastening efficiency, write for Bulletin TL-96a to Townsend Company, P.O. Box 237C, New Brighton, Pa.

The Fastening Authority

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Division • Santa Ana, California

In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Gananoque, Ontario*

NEW PRODUCTS and equipment

diameter, face both sides, and chamfer the edges.

When the work leaves the machines, the blanks are gaged. As dimensions approach their limits, the tools are adjusted automatically through electrical impulses from the gages.

Either machine can be shut down for changing tools while the other continues to operate. Use of storage-distribution units which can hold hundreds of parts makes this possible. *Write*: Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone*: Townsend 8-3900

Impact Wrench

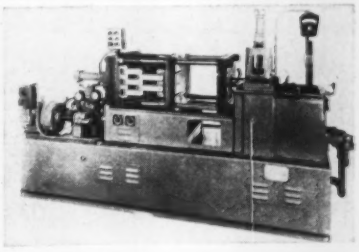
Model 300 is an electric wrench with a torque range of 300 to 450 ft lb. The tool is suited for heavy nuts $\frac{7}{8}$ in. in diameter and up, as well as for cap and lag screw driving and removal.

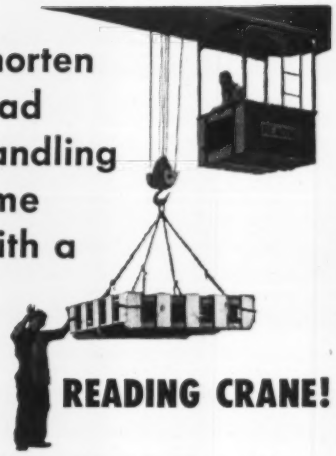
The wrench reaches maximum torque in six seconds. It can be used on direct or alternating current. *Write*: Black & Decker Mfg. Co., Towson 4, Md. *Phone*: Valley 3-4400

Diecaster Is Fast

Up to 500 shots an hour can be made by this machine. It handles shot capacities up to 4 lb. Locking pressure is 150 tons.

The die stroke is 8 in. Die





Shorten load handling time with a

READING CRANE!

● One well-known stove manufacturer wanted to speed-up assembly—a call to Reading Engineers led to complete solution. A 10-ton, double I-Beam, cab-controlled Reading Crane brought even better results than expected.

Get complete information from our latest 16-page bulletin "The Why and How of Faster Production". Write today.

READING CRANE & HOIST CORP.

CHAIN HOISTS • OVERHEAD TRAVELING CRANES • ELECTRIC HOISTS

2102 ADAMS ST., READING, PA.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866

THE WHELAND COMPANY

CHATTANOOGA 2, TENN.

NEW PRODUCTS and equipment

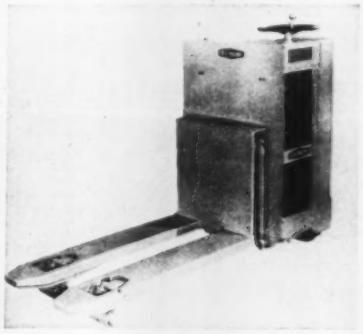
platens are 20 x 21 in.

Model 150Z is a goose neck machine for zinc, tin, and lead. Its plunger is hydraulically operated.

Model 150A is a cold chamber type unit for aluminum, brass, and magnesium. *Write*: American Die Casting Machinery Co., 1517 W. Thomas St., Chicago 22, Ill. *Phone*: Armitage 6-3334

Pallet Truck

This low-lift truck has a capacity of 4000 lb. It can stack 48-in. pallets at right angles to an aisle 6 ft wide. It has three speeds in forward and reverse. Maximum speed is 4½ mph.



Tips of the forks are tapered to make it easy to enter the pallets. *Write*: Raymond Corp., 91-155 Madison Ave., Greene, N. Y.

Positioner

Work loads of over 1000 lb can be handled by this positioner and assembly stand. It has a universal adapter plate to which any type of fixture can be attached.

The stand can be used as a weld positioner and assembly stand. It also can be used for equipment maintenance and servicing. *Write*: K. R. Wilson Inc., Arcade, N. Y.

Molten Metal Pump

The Centrifugal Gusher Pump, Model 9025-M, handles molten metals (solder, tin, lead, zinc) at temperatures up to 700° F.

Three aluminum cooling fans rotate simultaneously with the stainless steel shaft to keep the motor cool.

The vertical pump provides ca-

SANTOS DUMONT was NEWS

Santos Dumont was not a place, but a person — from Brazil. He gained a great deal of attention in 1907, when he flew an aeroplane a distance of 235 yards in 21 seconds — carrying a passenger! This historic flight took place in Paris, and was "news" all over the world. Curiously enough, few people at that time were aware of the Wright brothers' history-making flight at Kitty Hawk in 1903; most people then thought of "aviation" as floating about in balloons or dirigibles. It was something you watched at the County Fair — or perhaps at the International Bennett Cup Race.

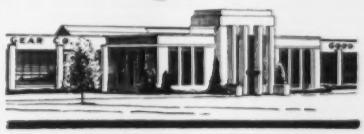
In this era of scientific and industrial pioneering, our founders Soren Sorensen and John Christensen came west to Cincinnati and started making gears. Cincinnati Gear's beginning was as modest as the aviation industry's; and like the aviation industry, we have grown and progressed significantly in the past fifty years. But one thing has not changed — our old fashioned attention to detail, that insures our gears being 100% *right* every time. It results in a reliability and dependability that our customers like — that *you'll* like too. Why not try us for your next custom gear order?

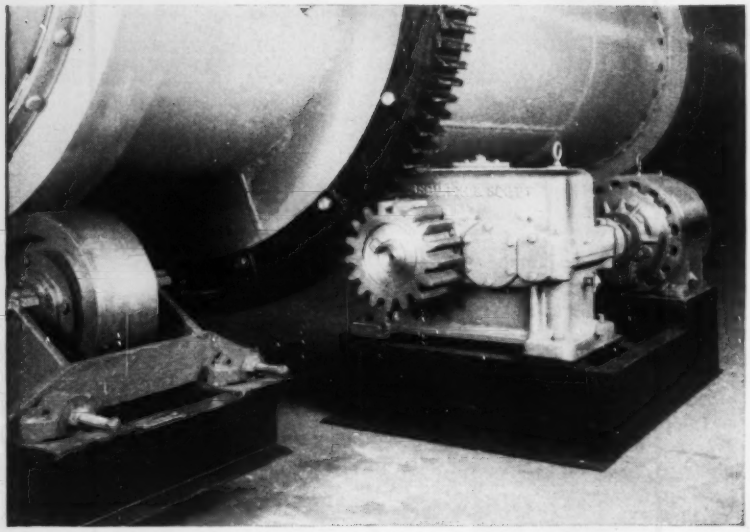
THE CINCINNATI GEAR CO.

CINCINNATI 27, OHIO

Fifty Years of "Gears—Good Gears Only"

CINTI®



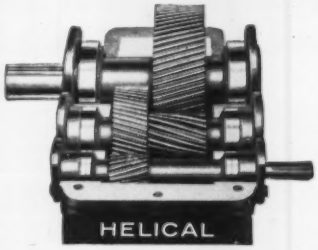


H&S speed reducer delivers 10 maintenance-free years of continuous service

Manufactured by the Louisville Drying Machinery Unit of the General American Transportation Corp., this Barite Dryer was installed in 1945. The H&S Size 2400 Speed Reducer and H&S Drive Pinion and Gears that you see above have given over 10 maintenance-free years of continuous moderate-shock service.

H&S Herringbone, Helical and Worm Gear Speed Reducers have been serving heavy industry for 26 years. If you are looking for dependable, trouble-free power transmission, won't you contact your H&S representative or write us today?

H&S Reducers are available in single reduction units in ratios up to 100 to 1; in combination units up to 700 to 1; and in double reduction units up to 10,000 to 1.



H&S Gears: There are 9 types for you to choose from! Spur Gears are cut up to 144" diameter and 1 D.P. Write today on company letterhead for the new H&S Gear Catalog No. 57.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue
Cleveland 14, Ohio

NEW PRODUCTS and equipment

pacities up to 7 gpm and heads up to 8 ft. *Write*: Ruthman Machinery Co., Cincinnati 2, Ohio. *Phone*: Main 1-5462

Alloy Steel

Byloy Grade W-2 is a combination of manganese, molybdenum, copper, and boron alloyed with steel in the electric furnace. The alloy has high strength and is resistant to fatigue and abrasion.

The steel is available in hot rolled plates and bars and can be supplied to specified hardness ranges. It is suitable for cold and hot forming, shearing, flame cutting, forging, machining, and weld joining. *Write*: Steel Sales Dept., A. M. Byers Co., Box 1076, Pittsburgh 30, Pa. *Phone*: Atlantic 1-8110

Truck Is Versatile

The FloorMaster is a selector truck that can be used with a tractor-trailer system, an in-floor dragline, or in manual operation.

The trucks are equipped with 8-in. casters and either 10 or 12-in. main wheels. Nine deck sizes are available, from 30 x 48 in. to 36 x

Ready, Set, GROW... with

REVERE ALUMINUM TUBE

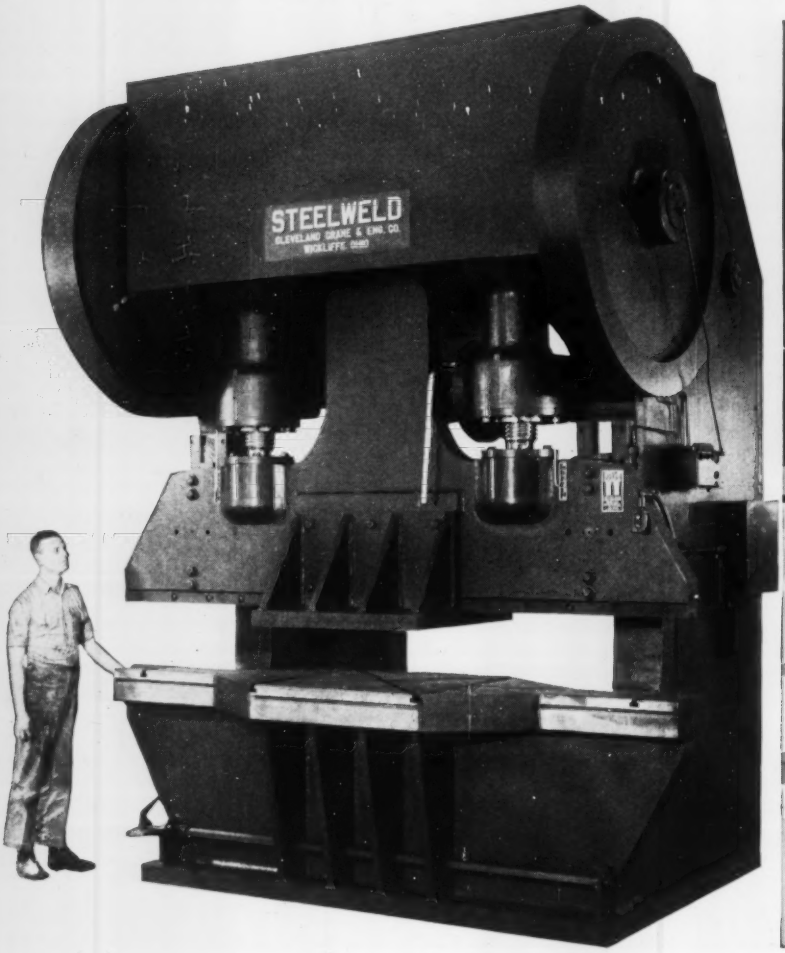
For aluminum tube that is right for its purpose and comes to you right on schedule, call the nearest Revere Sales Office. Revere is headquarters for tube . . . seamless drawn, welded, lockseam and other types, in an extensive range of sizes, alloys and tempers, both round and other than round. It will pay you to tie the growth of your business to the most dependable sources of supply. Revere Copper and Brass Incorporated. Founded by Paul Revere in 1801. Executive Offices: 230 Park Avenue, New York 17, N. Y.

Revere Aluminum Mill Products include coiled and flat sheet, both plain and embossed, circles and blanks, Tube-In-Strip,* extruded products, all types of tube, rolled shapes, electrical conductors, forgings, foil, and frozen food containers. *Revere's trademark for sheet metal containing inflatable channels.

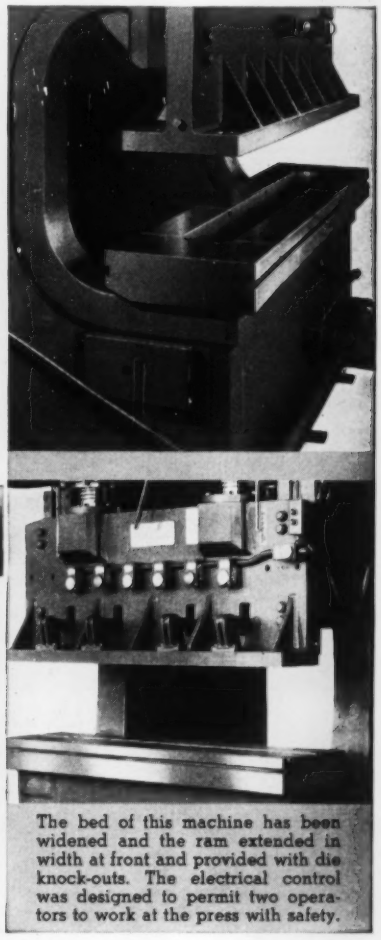
STEELWELD BRAKE DESIGN

Easily Adaptable For Special Requirements

Widening the bed of this 400 ton brake made it possible to serve a special purpose. The corresponding area of the ram was provided with a detachable ram bolster. With the bolster removed, normal brake operations can be carried on.



This Steelweld Brake was built with a double-plate bed having wide top and slot for punching purposes. This makes a low-cost press that is excellent within certain limits.



The bed of this machine has been widened and the ram extended in width at front and provided with die knock-outs. The electrical control was designed to permit two operators to work at the press with safety.

WHILE a standard press brake can handle a wide variety of metal-forming operations, often certain construction changes can be made that will permit doing work that normally would require a large costly forming press. Design changes can also be made that will speed production, improve safety or bring about other desirable advantages for specific types of work.

STEELWELD
PRESS BRAKES

Steelweld engineers have had a great deal of experience in tailoring press brakes to suit special jobs. Brakes have been built with many types of beds, with various shut heights, different speeds, unusual control arrangements, special gauges and safety devices, unique feeding equipment, etc. Because Steelweld's design is such as to make changes comparatively easy, the cost is reasonable.

For that next metal-forming job, whether it be a standard press brake operation or an out-of-the-ordinary one, it will pay you to investigate the possibilities of versatile Steelweld Press Brakes.

Write for free copy of Catalog No. 2010

STEELWELD DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. 7865 E. 281 St. • WICKLIFFE, OHIO

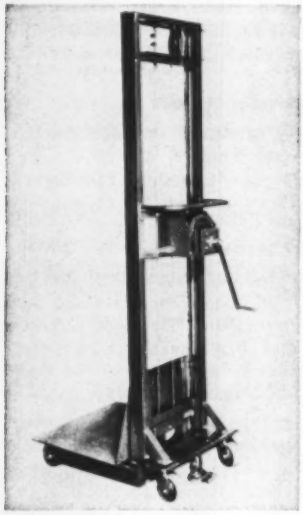
60 in. *Write*: Dept. R-14, Lewis-Shepard Products Inc., 125 Walnut St., Watertown 72, Mass. *Phone*: Watertown 4-5400

Heating Element

The Delta silicon carbide elements are used in periodic or continuous applications which require temperatures up to 2800° F. They can be used in oxidizing and protective atmospheres. *Write*: Globar Div., Carborundum Co., P.O. Box 339, Niagara Falls, N. Y. *Phone*: 6631

Mechanical Lifter

This crank up, crank down unit has a capacity of 1000 lb. It lifts 1½ in. per crank revolution.



The unit will lift 69 in. from floor level. *Write*: Colson Corp., Somerville, Mass. *Phone*: Somerset 6-3025

subjects

- Spring Terminology
- Typical Spring Buying Headaches
- How to Avoid Spring Buying Headaches
- Recording Special Quality Standards
- How Springs Are Priced and Quoted
- Analyzing Quotations
- Refusals to Quote
- Buying in Quantity
- Specifying Practical Tolerances
- Specifying Ends, Hooks, and Arms
- Specifying Finishes
- Packaging
- How to Verify Quality
- Reducing Rejects
- Characteristics of Spring Materials
- Cost Comparisons of Spring Materials
- Available Reference Data

BEST SELLER

for the spring buyer

Twelve pages of pertinent facts* and helpful advice on precision mechanical springs make up the new "Spring Buyer's Guide"—just published by Hunter and already much in demand.

Pictures, tables, and text are arranged to give the buyer of springs a realistic picture of his relations with his supplier, and how they affect cost, delivery and quality of these important parts.

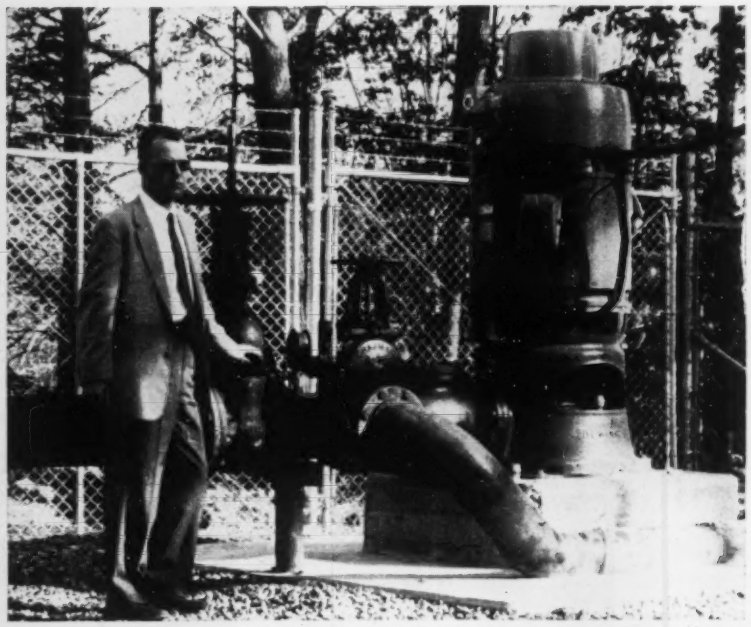
Your request on Company letterhead will bring a copy promptly. Just ask for Bulletin 301C.

HUNTER

HUNTER SPRING COMPANY

19 Spring Avenue, Lansdale, Pennsylvania

Manufacturers of: Precision Springs, NEG'ATOR® & FLEX'ATOR® Constant-Force Springs, Stampings & Assemblies, Retriever Reels, Force Gages, and Wire Fatigue Testers



This Deming 4700 Vertical Turbine Pump discharges 1600 gallons of water per minute!

HOW LOW COST WATER
CAN ADD TO PLANT PROFIT

High cost water can be an important factor in plant operating costs . . . knowing this, one eastern paper manufacturer checked into possible savings that might result from establishing and operating his own water supply.

First—A Deming distributor was consulted. Sydnor Pump and Well Co., Richmond, Virginia, made a preliminary survey of the ground water characteristics of the area.

Second—A test well was drilled to obtain complete geographical data.

Third—After studying survey results and geological data, a well 16 inches in diameter, 750 feet deep was drilled. A Deming 4700 Vertical Turbine Pump, water-lubricated type, was installed with a setting of 250 feet. The pump discharges approximately 1600 gallons per minute.

"We selected this Deming Turbine Pump for its water-lubricated design and semi-open, easily-adjustable impellers," said Mr. H. C. Berkely of Sydnor Pump and Well Co.

A Factory-Owned Water Works

This installation by an experienced Deming distributor meets the customer's present volume needs for pure water and provides for increased volume needs at lower cost.

For specific data on Deming Vertical Turbine Pumps, write for free BULLETIN 4700-A.

THE DEMING COMPANY— 535 Broadway - Salem, Ohio

DEMING
INDUSTRIAL PUMPS

NEW literature

Write directly to the company for a copy

Linear Amplifiers

Bulletin 3001-7, 2 pages, gives electrical and mechanical specifications, performance data, and uses of a linear amplifier. Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio.

Titanium

Buyer's Guide No. 3 lists prices of mill products and includes complete information on titanium alloy Ti-5Al-2.5Sn. Titanium Metals Corp. of America, 233 Broadway, New York 7, N. Y.

Vertical Miller

A machine that does three-dimensional tracer milling is discussed in this 6-page bulletin. Sundstrand Machine Tool Co., 2531 11th St., Rockford, Ill.

Immersion Processing

Bulletin 61, 8 pages, describes electroplating, aluminum anodizing, stripping, cleaning, pickling, bright dipping, and phosphating and how they can be done on automatic rack processing and plating machines. Frederic B. Stevens Inc., 1800 18th St., Detroit 16, Mich.

Value Analysis

Characteristics of standard and pearlitic malleable iron castings are discussed in this 8-page bulletin. Malleable Founders' Society, 1800 Union Commerce Bldg., Cleveland 14, Ohio.

Electrode Holder

Fully insulated, 300 and 400-ampere electrode holders are described in this 4-page bulletin. Lincoln Electric Co., Cleveland 17, Ohio.

Cap Screws

Self-locking and self-sealing hexagon head screws are described in this 4-page bulletin. Cleveland Cap Screw Co., Box 579, Cleveland 28, Ohio.

Socket Head Screws

This 8-page bulletin gives torque-tension data on socket head cap screws. Mac-it Screw Div., Strong, Carlisle & Hammond Co. Inc., 1392 W. Third St., Cleveland 13, Ohio.

Rubber Parts

Punched products, gaskets, and descriptions of natural rubber and syn-

In these modern annealing furnaces, a clean, dry nitrogen atmosphere assures clean, bright sheet. Annealing temperature is measured accurately with load thermocouples for proper control of temperature of crystallization of the rolled metal structure and to insure meeting specified mechanical-property limits.

Anaconda Aluminum Coiled Sheet

ALUMINUM COILED SHEET produced to the high standards of quality and uniformity maintained by The American Brass Company is now available for prompt shipment from our Torrington Division to all points in the United States.

It is rolled on the most modern, high-speed equipment, X-ray controlled to close tolerance in gage. High-speed, electronically operated slitters give exact widths with clean edges on evenly and tightly wound coils. Latest annealing furnaces—with controlled atmosphere and temperature—provide high uniformity of metal structure to meet specified mechanical-property limits.

IN THESE WIDTHS: Maximum 28 inches
Minimum 3/8 inch

IN THESE THICKNESSES: Maximum 0.064 inch
Minimum 0.006 inch

COIL WEIGHTS: Up to 100 lb. per inch of width
ARBOR SIZES: 4, 6, 8, 10, 12, 16, and 20 inches in diameter

ALLOYS: 1100, 3003, 3004, 5005, 5050, 5052

TEMPERS: Alloy Nos. 1100, 3003, 5005
—O, —H12, —H14, —H16, —H18
Alloy Nos. 3004, 5005, 5050, 5052
—O, —H32, —H34, —H36, —H38

FOR IMMEDIATE ACTION, call The American Brass Company Office nearest you. The American Brass Company, Waterbury 20, Conn.

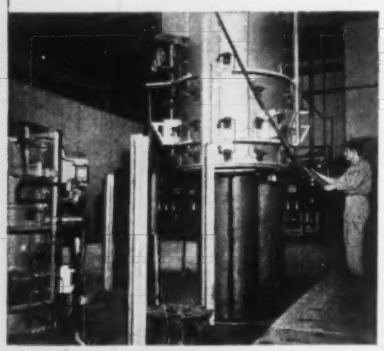
8797

ANACONDA®
ALUMINUM COILED SHEET
Made by The American Brass Company

Bright Annealing?
Normalizing?
Nitriding?
Spheroidizing?

You can't beat

CONTINENTAL TOP HAT



COVER-TYPE ANNEALER

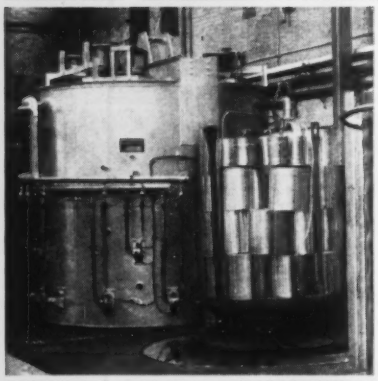
Faster and More Uniform Heating Rate

Extra large volume of recirculating atmosphere.

Highest Production per Unit

Versatility

Can be used for bright annealing, normalizing, nitriding, or spheroidizing coiled wire or strip—ferrous or nonferrous.



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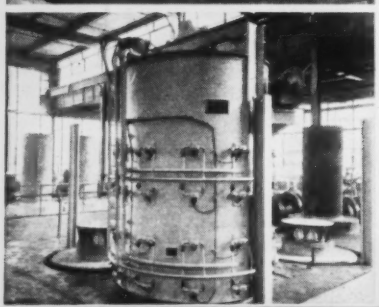

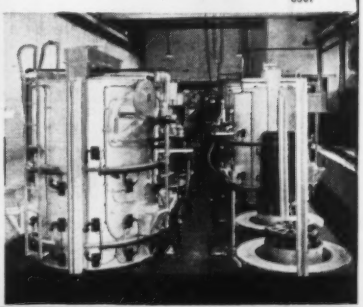

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NEW LITERATURE

thetics are covered in this 12-page bulletin. Williams-Bowman Rubber Co., 1945 S. 54th Ave., Cicero 50, Ill.

Inert Gas Generators

Bulletin 114, 4 pages, lists capacities, dimensions, and operating details of standard generators. Thermal Research & Engineering Corp., Conshohocken, Pa.

Hose Fittings

Full flow fittings and hose for medium pressure service are described in Bulletin 4434, 4 pages. Tube & Hose Fittings Div., Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio.

Meter for Liquids

Bulletin 54-766-38, 8 pages, describes construction and operation of meters which indicate and total liquids. Hays Corp., Michigan City, Ind.

Clutches and Brakes

Electromagnetically operated, disc type friction brakes and clutches are described in this 8-page bulletin. Dynamatic Div., Eaton Mfg. Co., Kenosha, Wis.

Carbides, Bits, Flat Stock

TTI-57 is a 56-page catalog on carbide tips, tools, and inserts. High-speed steel tool bits are listed in Bulletin TBI-57, 8 pages. An oil and an air hardening steel grade of ground flat stock are covered in Bulletin GFSI-57, 8 pages. Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa.

High Temperature Alloy

This 24-page bulletin describes the properties of an alloy recommended for use at high stresses up to 1500° F and at moderate stresses up to 2000° F. Literature Distribution Section, Haynes Stellite Co., division of Union Carbide Corp., 30-20 Thompson Ave., Long Island City 1, N. Y.

Phosphating Large Parts

Bulletin B-6624, 2 pages, tells how to phosphate parts too large for tanks or spray machines. Oakite Products Inc., 134E Rector St., New York 6, N. Y.

Crawler Crane

A 1 yard, 25 ton capacity crane is described in this 20-page bulletin. Bay City Shovels Inc., Bay City, Mich.

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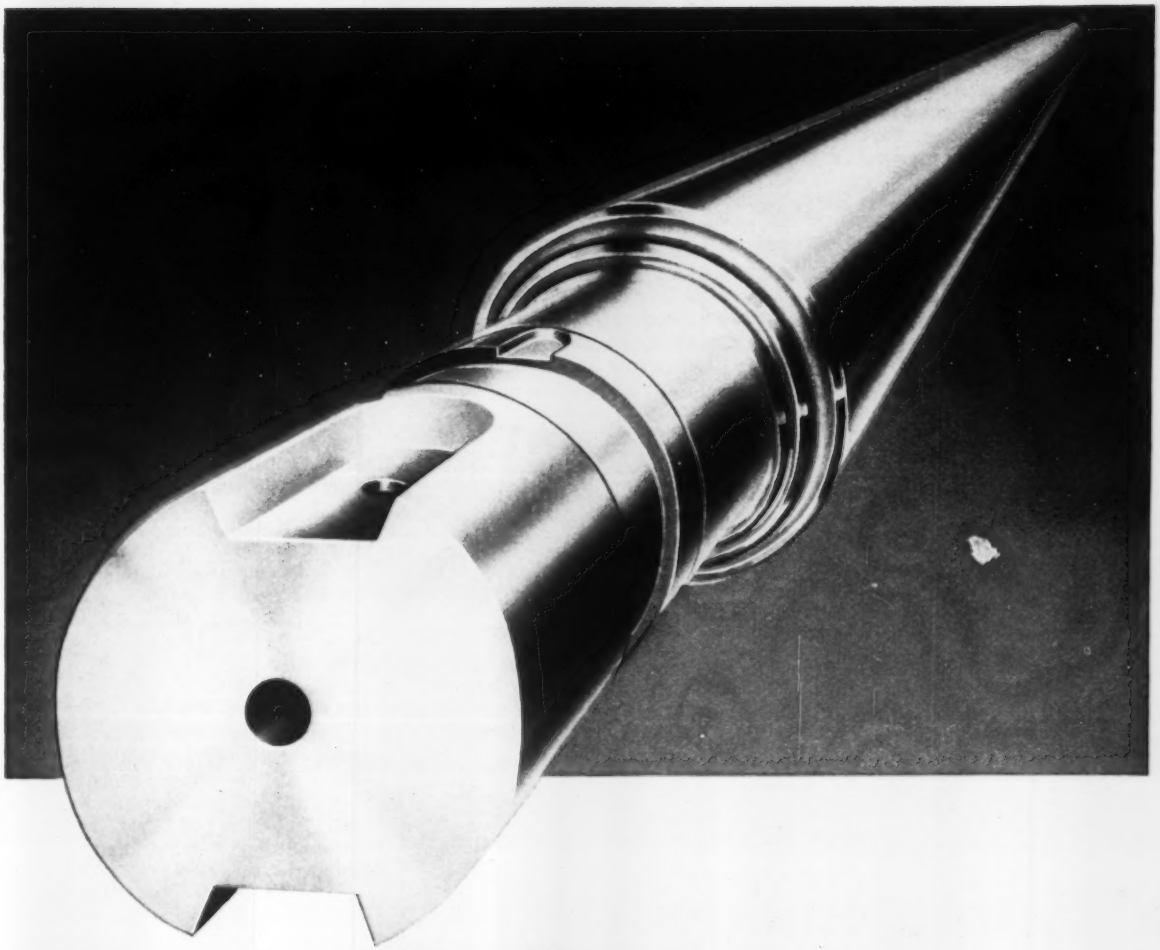
Beryllium copper, chromium copper, phosphor bronze, nickel silver, brass, stainless, and nickel-iron strip rolled



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Avonmore (Westmoreland County) Pennsylvania

General Steel Castings Corporation: General Offices, Granite City, Ill. • Plants: Granite City, Ill.—Eddystone, Pa.—Avonmore, Pa.

NEW LITERATURE

to close tolerances and thin gages are described in this 12-page bulletin. Penn Precision Products Inc., 501 Crescent Ave., Reading, Pa.

Cleaning Solvent

Properties and uses of a cold cleaning solvent are described in a 16-page bulletin. Solvent Sales Dept., Dow Chemical Co., Midland, Mich.

Speed Reducers

Torque arm and flange mounted worm gear reducers are covered in bulletin SM-57, 8 pages. Winsmith Inc., Springville (Erie County), N. Y.

Substations

Package unit substations are described in Bulletin SD-61, 8 pages. Dept. SA, Square D Co., 6060 Rivard St., Detroit 11, Mich.

Rod and Wire Handling

An automatic system for handling rod and wire coils is described in Bulletin 3-57-W, 4 pages. Lee Wilson Engineering Co. Inc., 20005 W. Lake Rd., Cleveland 16, Ohio.

Wire, Rod, and Strip

Chemical, physical, and mechanical properties of Monel, nickel, nickel-clad copper, Inconel, Incoloy, Nionel, Ni-Span C, and stainless and heat resisting steels are given in this 35-page handbook, No. 12. Techalloy Co. Inc., Rahns, Pa.

Carbon and Graphite

High temperature uses and properties of carbon and graphite are discussed in this 8-page bulletin. Speer Carbon Co., St. Marys, Pa.

Magnetic Motor Starters

Size 0 and 1 starters are covered in Bulletin GEA-6611, 20 pages. General Electric Co., Schenectady 5, N. Y.

Electrical Steel

Here's a 20-page bulletin describing an iron-nickel steel. Advertising Dept., Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.

Load Handling

A truck which carries materials in a detachable steel container is covered in Bulletin 457, 4 pages. Ingersoll Kalamazoo Div., Borg-Warner Corp., 1810 N. Pitcher St., Kalamazoo, Mich.

End-Welding Studs

This 38-page bulletin lists dimensions of studs, ferrules, and weld fillets and describes plating, annealing, flux, and analyses and mechanical properties of stud materials. Nelson Stud Welding Div., Gregory Industries Inc., Lorain, Ohio.

Bin Unloading

Bulletin 500-830, 4 pages, describes a device that unloads coal and other bulk solids without arching, rat holing, or funneling. Technical Information Dept., Bituminous Coal Research Inc., 121 Meyran Ave., Pittsburgh 13, Pa.

Adjustable Shelving

A line of steel shelving is described in Bulletin SE-5, 6 pages. Penco Metal Products Div., Alan Wood Steel Co., 200 Brower Ave., Oaks, Pa.

Structural Steel

Complete technical information (including loading tables) on joists, studs, channels, ribbed decking, and curtain walls is presented in this 24-page bulletin. Stran-Steel Corp., Detroit 29, Mich.

Stainless Fasteners

This 8-page bulletin lists screws, nuts, bolts, washers, rivets, and government specification AN fasteners. Allmetal Screw Products Co. Inc., 821 Stewart Ave., Garden City, N. Y.

Portable Machining Tool

Bulletin VM-57, 28 pages, describes a portable tool that does milling,

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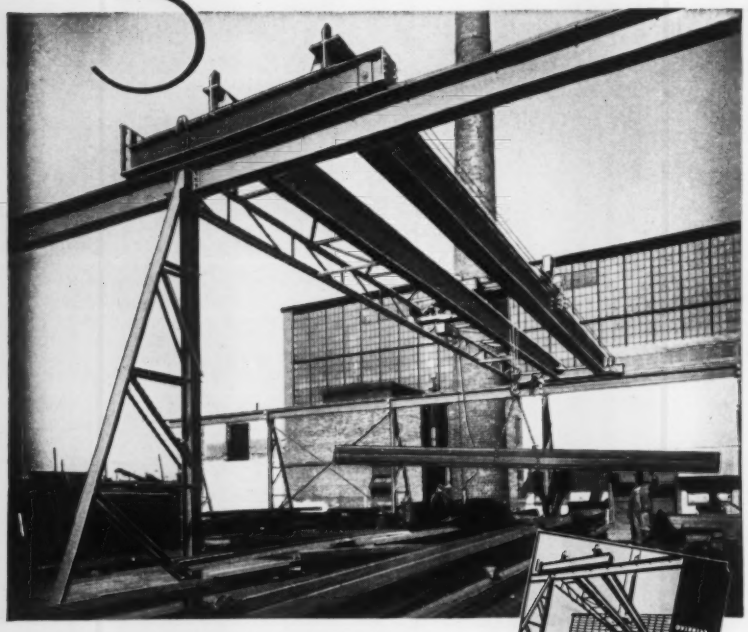

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NEW LITERATURE

boring, shaping, slotting, grinding, drilling, and other machining operations. Dumore Co., 1300 17th St., Racine, Wis.

Reinforced Concrete

Use of welded wire fabric in building construction is described in this 46-page manual. Dept. 50, Wire Reinforcement Institute Inc., 1049 National Press Bldg., Washington 4, D. C.

Stamping Machines

Multislide machines for the automatic production of precision stampings are described in Bulletin 15, 16 pages. U. S. Tool Co., Ampere (East Orange), N. J.

Centralized Filtration

Systems for cutting oils, water base coolants, grinding oils, honing and lapping oils, and other fluids are covered in Bulletin FB100, 4 pages. U. S. Hoffman Machinery Corp., 105 Fourth Ave., New York 3, N. Y.

Liquid Strainers

Self-cleaning strainers with perforations 0.023 in. in diameter are described in Bulletin W-6SC, 4 pages. Golden-Anderson Valve Specialty Co., 1252 Ridge Ave., Pittsburgh 33, Pa.

Magnetic Chucks

Control units for quick demagnetization of low voltage magnetic chucks are described in this 6-page bulletin. Sundstrand Magnetic - Pneumatic Products Div., Sundstrand Machine Tool Co., 1020 Ninth St., Rockford, Ill.

Milling Cutters

Catalog HSS-1, 32 pages, describes high speed steel cutters for machining aluminum, light metal alloys, and ferrous materials. Goddard & Goddard Co., 12280 Burt Rd., Detroit 23, Mich.

Pipe Bending

Methods of bending carbon, alloy, and stainless steel tubing and pipe are discussed in Bulletin TDC-187, 6 pages. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

NEW BOOKS

Materials Handling Equipment, D. Oliphant Haynes, Book Div., Chilton Co., 56th and Chestnut St., Philadelphia 39, Pa. 636 pages, $17.50.

Basic types of equipment and their capabilities, unit-load handling, integration of production machinery with handling equipment, package handling, analysis and design of handling systems, cost analysis, and the organization and control of handling systems are included in this basic text.

Design of Die Castings, Gustav Lieby, American Foundrymen's Society, Golf and Wolf Rds., Des Plaines, Ill. 208 pages, $8.

Features of diecast products, methods and processing principles, die design and construction, and tolerances are discussed in this translation of the German edition.

Ductile Chromium, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. 376 pages, $7.50.

New fields of usefulness for chromium and its alloys are forecast. This book covers work on the extraction, fabrication, and properties of the metal.

Scrap Yearbook, 1957 Edition, Institute of Scrap Iron & Steel Inc., 1729 H St. N.W., Washington 6, D. C. 100 pages, $3.

Scrap consumption, exports, and imports are tabulated. Included are specification, prices, and stocks.

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Designed and Built By Loftus

Late in 1956, the largest open hearth furnace in the world was tapped at Weirton Steel Company, Division of National Steel Corp., Weirton, W. Va.

Designed and built by Loftus Engineering Corp., this huge furnace has a rated capacity of 600 tons, is approximately 111 feet long by 30 feet wide, and construction was completed in less than a year. Operation is simple since the furnace is equipped with full automatic control.

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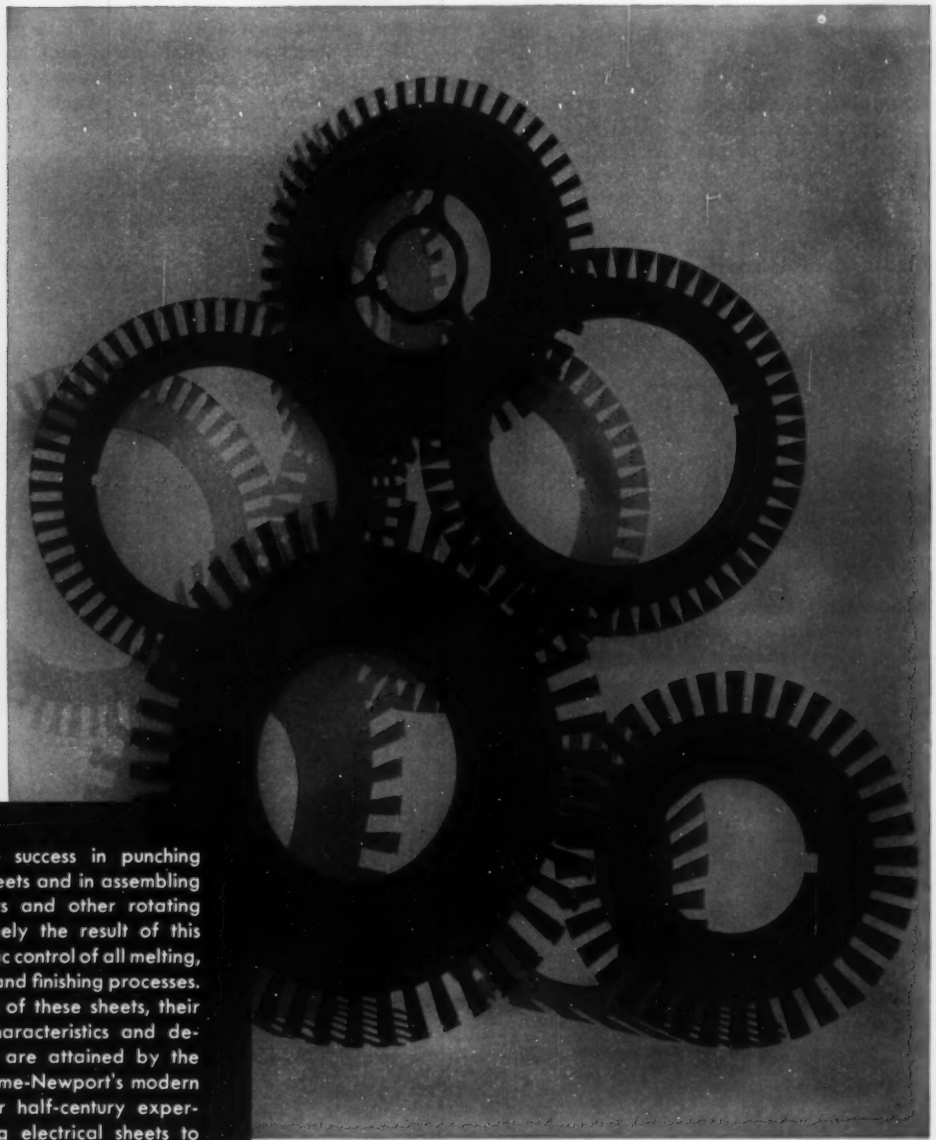


Users' immediate success in punching Acme-Newport sheets and in assembling motors, generators and other rotating equipment is largely the result of this Company's scientific control of all melting, rolling, annealing and finishing processes. The uniform gage of these sheets, their clean punching characteristics and dependable quality are attained by the combination of Acme-Newport's modern facilities and their half-century experience in producing electrical sheets to specifications of leading electrical equipment manufacturers. Our electrical engineers would like to discuss your requirements and our ability to fill them.

Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

A SUBSIDIARY OF ACME STEEL COMPANY

Market Outlook

STEEL SHORTAGES shouldn't plague buyers again soon.

Not only have some of the buying incentives disappeared, but steelmaking capacities are rising substantially (see Page 79).

BULGE—The round of expansion which began in 1955 is adding 7.6 million tons this year to the nation's capacity for making steel for ingots and castings. This is the most that has come in per year in the current round. It means that the country's capacity next Jan. 1 will be 141 million tons, a 5.6 per cent increase over that of last Jan. 1.

KEEPING UP—Not only is the capacity to melt steel being expanded, but the capacity to finish it is being enlarged and updated. A case of updating is Inland Steel Co.'s steps to enlarge its capacity to produce wide flange beams and to discontinue production of railroad rails. Wide flange beams have become popular as a construction material, while demand for rails has declined with the contraction in railways.

This year's 7.6 million ton increase in steelmaking capacity is on top of last year's 5,096,000 ton rise. Another 5.3 million tons are under construction and will be completed next year.

COOLERS—These additions have been one of the factors in lessening consumers' zeal to buy steel. They know there's a bigger supply available. At the same time, they don't have to hoard tonnage to carry them over a steelworkers' strike. The present three-year steel labor contract promises labor peace. And, too, they find their needs for current consumption less pressing, now that business in general is slower. Absent are any big needs for national defense, and yet the steelmaking capacity will be far greater than it was in the last two wars.

By next Jan. 1, the country's steelmaking capacity will be 59 per cent larger than it was when World War II started, and 42 per cent bigger than it was at the beginning of the Korean War.

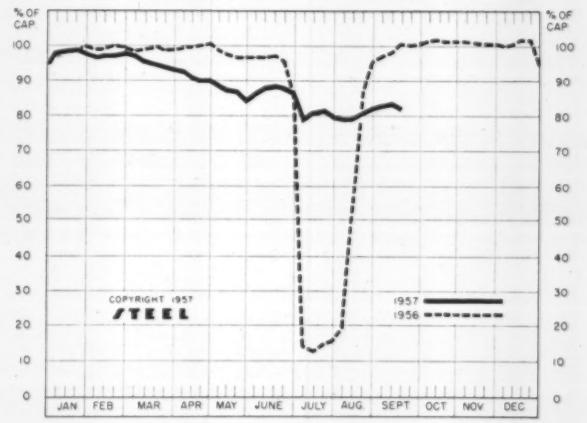
GETTING READY—The steel industry is not surprised that its capacity has exceeded current needs. It is preparing for the 1960s when substantial increases in demand are expected. By that time, family formations are expected to increase when babies born in the wave of births in the 1940s start marrying. The more families there are, the more facilities and equipment there must be to serve them. This will take steel.

In addition to preparing for the 1960s, the steel industry is providing itself with a little surplus of capacity for safety and for economy.

PRODUCTION—Current demand is sufficient to sustain ingot production in the low 80s. In the week ended Sept. 15, output of steel for ingots and castings was at 81.5 per cent of capacity—a decline of 1.5 points from the preceding week's rate.

PRICES—Steel prices are steady. U. S. Steel Corp., largest producer of tin mill products, announced it will hold the line on these products, at least until Dec. 31. Scrap prices continue to slip. In the week ended Sept. 11, STEEL's price composite on steelmaking scrap declined to $50.17 a gross ton, a drop of $1.66 from the preceding week's level.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Sept. 15	Change	Same Week 1956	Same Week 1955
Pittsburgh	82.5	+ 2*	98.5	97.5
Chicago	85	+ 1*	102	96.5
Mid-Atlantic	85	0	98	93
Youngstown	77	— 2	105	100
Wheeling	92.5	0	98.5	97
Cleveland	81	+ 0.5*	107	98
Buffalo	100	0	107.5	105
Birmingham	85	0	95.5	95.5
New England	52	+ 2	90	86
Cincinnati	82.5	+ 1*	91	89.5
St. Louis	86.5	+ 13*	95.5	106
Detroit	97	+ 3*	97.5	94
Western	94	— 2	97	103
National Rate	81.5	— 1.5	100.5	95.5

INGOT PRODUCTION‡

	Week Ended Sept. 15	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	132.3†	129	128.4	154.2
NET TONS (In thousands)	2,126†	2,073	2,062	2,477

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 73

Technical Outlook—p. 129

Getting your share of today's $400 billion market?

These dynamic and expanding times call for sales methods that measure up to the modern buying market. A tremendous amount of money is spent by industry for needed goods and services—*over $135 million each business day.*

There are many ways in which a company can assure itself of a fair share of our fast-moving industrial market: through sales expansion . . . marketing realignment . . . new products . . . and advertising. One of the most economical ways is with *a well-balanced advertising program!*

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Russell, Burdsall & Ward Bolt & Nut Co.

Fastener Outlook Is Good

Dollar volume will set a record, but tonnage will drop beneath the 1956 level. Auto and appliance orders are picking up. High strength bolts gain acceptance

THIS YEAR, makers of fasteners are setting their sights on the best dollar sales ever recorded. Through July—the latest month for which industry statistics are available—sales were 7 per cent ahead of the 1956 pace. All manufacturers contacted by STEEL unanimously agreed that the fourth quarter will be good enough to hold the advantage.

Tonnage Down — But that's likely to be the only record the industry will set this year. Tonnage at the end of seven months was off 7 per cent from the 1956 level, and there's not much chance of making up the loss.

Among major producers, the pace in August was mixed. One says it was a tremendous month compared with July and past summer months. Another says: "August was a low month, the third quarter is lousy. It would take a whale of a big fourth quarter to make up for it."

While the next quarter will be good, it probably won't be that good. Right now, the most encouraging sign is the pickup in orders from automakers. One producer remarks that advance orders in August were the heaviest he had ever received from the auto industry. Releases are coming in slow for September, but as model changeover progresses so will shipments of nuts, bolts, and screws. Appliance customers are showing "some quickening of the pulse," as one sales manager puts it. Another notes: "Now that appliance producers are making new model introductions in late summer and fall, it has made a noticeable difference in our fourth quarter business."

Price Makes Difference — Two factors account for the gap between this and last year's tonnage and dollar volume. Most of the decrease in shipments has been concentrated in the smaller, standard items, while the larger, more expensive sizes have held up well.

For instance, one producer reports that sales of high strength bolts through July were 133 per cent of the comparable 1956 total. This is a heat-treated item and carries a higher unit price. Another says that sales of large fasteners to the railroad industry for the car building program are good and getting better, but so far this year his shipments of smaller size bolts and screws to the appliance industry have been down. But the big factor in improved dollar sales is higher prices.

"In the past year, we've had two general increases," says the vice president of a midwestern company. "The first was the result of extra increases on steel last January. The second and larger increase was the result of both higher cost of materials and labor at midyear. We passed the point some time ago where we could absorb such increases. If costs go up again this year, so will our prices. I would say that these increases have accounted for almost all the improved sales position of our company."

Look Ahead—Next year should be at least as good as this one, perhaps better. While the standard sizes are still the bread and butter of the fastener industry, items like high strength bolts are the jam.

"In two years, I expect high

strength bolts to be the primary method of constructing large commercial buildings and bridges," reports the sales manager of an eastern producer. It is reported that 1.02 million of these bolts were used in building the Mackinac bridge in Michigan. Practically all large cities accept bolted construction; architects and engineers are specifying it to a far greater extent today than they did even a year ago.

The government's road building program also should provide a good market in 1958. So far this year, orders from makers of road building equipment have been disappointing because construction of roads under the program has been slow in starting. By spring of next year, there should be a pickup, fastener producers feel. Also due for a pickup is the farm implement market.

"This has been in a depressed condition for about three years," says one fastener sales executive. "With farm income rising, we expect it to come alive in 1958." Railroad car builders, still working on a heavy backlog, should continue active in 1958, especially if the supply of structurals and plates continues to ease. But one large car builder has told his fastener supplier to expect some declines in orders by next spring if orders for new cars do not pick up.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 203 & 204

"Improvement in automotive ordering of hot and cold-rolled sheets is now well established."

That's the way a Pittsburgh area sheetmaker describes the current sheet market situation. This producer thinks production will attain a near-capacity pace late in the fourth quarter.

But other district interests express doubt that auto builders' purchases will support sheet mill operations above 85 per cent in the closing quarter.

At Chicago, cold-rolled orders are coming to the mills in good volume, some commitments calling for shipments in the last two months of the year. Automotive business currently is predominant in the area, but miscellaneous requirements also are noticeably improved.

One midwestern cold-rolled sheetmaker is practically sold out for October and is convinced it will have full mill operations over the remainder of the year.

The appliance industry continues to specify tonnage, but volume is little changed from the recent low level. Both auto builders and appliance manufacturers are operating on relatively low inventories. So long as prompt shipment tonnage is available they see no danger of being caught with short supplies.

Hot-rolled demand is following the general pattern of cold rolled. But the upturn in hot rolled in the Midwest is noticeably smaller than for cold rolled. The auto influence is largely behind improved demand.

Galvanized sheets are doing better than some producers had anticipated. Mill operations continue below capacity, chiefly because of increased productive facilities. Electrical sheet needs are off, reflecting curtailments in home appliances. For the same reason, orders for enameling sheets are disappointing. Some pickup on appliance account is expected as pro-

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It's the high concentration of etchant and the high temperature you have to use in your tanks that causes this terrific foaming. Pennsalt Aluminum Etchant 16 will let you operate twenty degrees cooler, and you'll need only half the concentration you're using now.
But remember, Steve, we can't afford to stain or streak these extrusions.
Don't worry about that, Ernie. AE-16® built its reputation on a fine satin etch—and no scale in the tanks, either! Let me send you a drum tomorrow.

duction for the Christmas rush accelerates.

Wire . . .

Wire Prices, Pages 204 & 205

Wire orders are up slightly but not enough to materially alter the dull market picture. Prompt shipments are available on most items, and consumers are not doing much in the way of forward buying. Some slight pickup in automotive requirements is noted, but the spurt in demand is not of major proportions. Demand for wire rods is reported a little more active.

Steel Bars . . .

Bar Prices, Page 202

Carbon bar sales volume continues disappointing at most points, but the general market situation appears mixed and suppliers are pinning hopes for an active fourth quarter on a spurt in automotive requirements.

Pittsburgh area mills report hot-rolled demand picked up at the opening of this month, then lapsed. They now think September volume will be no greater over-all than August's. One less day in September is a factor.

District mills say there is no sign of a significant upswing in demand. An October pickup is expected, but sellers say specifying for that delivery should be showing up by now. Users appear to be continuing to order on short leadtime. This includes auto builders.

New England consumers' orders for hot-rolled bars are reported close to 20 per cent over the third quarter low mark. A substantial part of the larger business is for October delivery.

Demand for cold-finished bars continues at about the August level. Users seem to be depending on producers' stock lists for prompt deliveries. A wide range of sizes and grades can be had on short notice at most market centers.

The cold drawers are limiting their purchases of hot bars. Some converters (in New England) are operating several points below the national average. An exception to the dullness in the cold-drawn market is the leaded carbon grade, which is moving steadily. Alloy bars are sluggish with aircraft requirements off.

Chicago district sellers say demand for bars has not picked up to the extent cold-rolled sheets have as a result of automotive buying. They think an upturn will come shortly as new car production accelerates. Some improvement in leaded bars is noted in the district, largely on auto account.

Tin Plate . . .

Tin Plate Prices, Page 204

Changes in tin plate pricing, announced last week by U. S. Steel Corp. and its general operating divisions (Columbia-Geneva Steel and Tennessee Coal & Iron), are being considered by other tin plate makers.

U. S. Steel is continuing its current mill price bases and lists of extras and deductions on tin plate (electrolytic and hotdipped), black plate, and terne plate through Dec. 31. It has been the custom of the corporation to announce prices on its tin mill products to apply during six-month periods. Effective Jan. 1, 1958, it will discontinue that practice and will

You know, Ernie, while Steve Choren from Pennsalt was in yesterday to adjust our phosphating cycle, he looked this over and thought he had the answer.
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Well, Ernie, how did you make out with the Pennsalt etchant?
Fine, Steve! No more of that annoying foam, no more scale problem in the tanks, and we're getting a fast, clean etch with Pennsalt AE-16. Thanks for pulling me out of a tight spot.

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In Canada: **Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.**

announce price revisions not less than 35 days prior to their effective date. Policy on the price in effect at time of shipment continues.

Tin plate suppliers report strong shipments this month. Orders for fourth quarter are less encouraging; demand from can manufacturers is off. Drought and high inventories are serving to intensify the seasonal slack.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 202

Reinforcing bar fabricators' backlogs are slipping. Order completions exceed new bookings, which is normal for the season. Shipments are heavy as work is resumed following ending of the recent cement strike. Building and road construction jobs that were held up are going ahead at full speed.

Pacific Northwest bar rollers' backlogs are off, but they are operating steadily. Recent district placements have been in small lots, but total volume is fair. Bids are in for 500 tons of bars for Washington (state) road projects; an additional 250 tons are involved in bids called for Sept. 24.

Plates . . .

Plate Prices, Page 202

Most sellers of sheared plates anticipate an active fourth quarter demand, but consumers appear to be more disposed to order on a monthly basis than has been the case for some time. Universal plates also are moving more slowly.

Suppliers of the heavy gage material expect to fill their fourth quarter order books without too much difficulty. Pittsburgh mills say demand is continuing to increase from ship and barge builders, offsetting the adverse effects of declines in railroad equipment requirements. Construction needs also continue heavy.

Light gage plates are freely available. Much material still is offered for September and October shipment by the strip mills.

On the West Coast, pipe jobs at Portland, Oreg., and Tacoma, Wash., involving 625 tons were placed last week with Portland and Seattle fabricators. The outlook

Shipments of Steel Products—July, 1957

(All grades; Net Tons)

Products	Carbon	Alloy	Stainless	Shipments Through July 1957	1956*
Ingots	21,904	15,255	2,557	299,725	460,380
Blooms, etc.	133,472	21,674	1,190	1,649,792	1,486,015
Tube rounds	3,013	161	—2	50,058	10,602
Skelp	11,741	.....	.....	99,685	113,324
Wire rods	61,118	1,007	287	597,373	694,873
Structurals	576,259	5,452	.....	4,024,651	3,261,836
Steel piling	52,031	.....	.....	352,145	246,435
Plates	738,225	49,890	3,608	5,876,734	4,790,751
Rails (standard)	107,176	.....	.....	848,119	724,690
Rails (other)	8,248	.....	.....	54,401	66,792
Joint bars	8,319	.....	.....	60,164	56,508
Tie plates	17,723	.....	.....	185,849	203,648
Track spikes	5,936	.....	.....	54,790	70,604
Wheels	28,952	39	.....	225,753	225,774
Axles	15,440	15	.....	124,257	108,132
Bars—hot rolled	392,012	93,854	3,627	4,834,222	5,628,231
Bars—reinforcing	171,793	—7	.....	1,506,085	1,544,621
Bars—cold drawn	67,053	13,655	3,526	831,468	1,191,620
Tool steel	878	5,156	.....	62,117	87,089
Standard pipe	196,648	10	.....	1,714,441	1,869,074
Oil country goods	197,533	32,178	.....	1,814,620	1,684,445
Line pipe	351,768	7	.....	2,531,355	2,150,421
Mech. tubing	39,257	11,912	365	498,640	645,547
Pressure tubing	21,070	6,018	2,049	268,194	236,026
Wire—drawn	162,967	2,373	2,040	1,616,163	1,994,390
Nails & staples	31,326	.....	.....	291,988	385,828
Barbed wire	2,896	.....	.....	46,080	60,495
Woven fence	11,236	.....	.....	157,873	208,838
Bale ties	5,561	.....	.....	39,045	41,817
Black plate	39,871	.....	.....	397,159	511,900
Tin plate—hot dipped	39,234	.....	.....	501,153	646,381
Tin plate—electro	380,815	.....	.....	3,164,095	3,188,725
Sheets—hot rolled	502,671	26,881	1,777	4,913,506	5,614,174
Sheets—cold rolled	778,255	2,603	10,503	6,918,295	8,744,079
Sheets—galvanized	167,213	34	.....	1,459,274	1,928,253
Sheets—other coated	13,622	.....	.....	117,640	159,752
Elec. sheets & strip	3,680	37,982	.....	401,200	534,907
Strip—hot rolled	76,277	1,637	525	867,777	1,170,886
Strip—cold rolled	61,155	1,186	11,761	706,975	1,073,662
Totals (1957)	5,504,348	328,972	43,813	50,162,861	53,821,525

*—Includes August because July shipments were combined with that month because of the steel strike.

Data from the American Iron & Steel Institute.

for work involving plates in the Pacific Northwest is regarded with more optimism by the smaller shops that are being aided by the easing in the steel supply situation. They expect to be in better position to compete on pending work. Sizable tonnages of plates are involved in two ferries to be built for the Washington (state) Toll Bridge Authority. Bids, called for Oct. 15, are restricted to state contractors. The ferries are estimated to cost about $2.6 million each.

Phoenix Iron & Steel Co., Harrisburg, Pa., suspended operations at its 42-in. universal mill and 89-in. sheared mill for the first two weeks of September. It is operating its 126-in. sheared plate mill at capacity.

Tubular Goods . . .

Tubular Goods Prices, Page 206

Demand for tubular specialties is expected to improve in the fourth quarter. Pressure and mechanical tubing demands have been slow throughout the current contracting period. Improving requirements for standard pipe in residential construction are stimulating demand in the merchant market.

Suppliers of oil country goods anticipate fourth quarter ordering to be slower than it has been in recent quarters, but they expect to operate at capacity through the remainder of the year. Accelerated sales promotion will be required if they are to continue at capacity.

Slowing down in cast iron pipe requirements is seen as the fall season nears. Public work is expected to slacken gradually. Several sizable contracts are pending in the Pacific Northwest.

Warehouse . . .

Warehouse Prices, Page 208

The upturn in business recorded by distributors was short-lived. Sales volume increased gradually for a few days following the Labor Day holiday, then dropped below the August level.

Fabricators are not showing any particular buying interest in any product except heavy, wide plates and wide flange beams. Sales of sheets, bars, and tubular products range from moderate to good.

Standard pipe sales have increased slightly. Demand for light plates is falling gradually as that product becomes easier to obtain from mills.

Distributors' inventories are in good balance. No specifications are in short supply. Structurals and heavy plates are available in most districts in sufficient quantities to satisfy requirements of the construction industry for the balance of the year.

Warehousing interests in the Pacific Northwest say that prospects for the second half are promising. The price situation in the Seattle area is firm, with published schedules generally observed. But reports from the Portland, Oreg., district indicate some price cutting.

Iron Ore . . .

Iron Ore Prices, Page 210

During August, the Pittsburgh & Conneaut Dock Co., subsidiary of U. S. Steel Corp., broke all records for iron ore unloading at its Lake Erie docks. The total was 2,165,000 gross tons, compared with the previous record of 2,119,000 tons established in July. So far this season, a total of 8,124,000 tons have been unloaded by this U. S. Steel subsidiary.

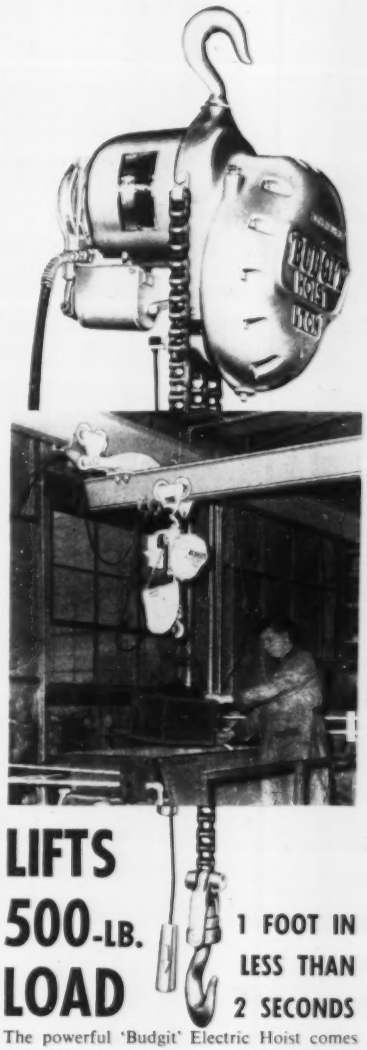
Shipments of iron ore down the Great Lakes route in August totaled 13,172,356 gross tons, reports the American Iron Ore Association. This was 5,127,328 tons more than the 8,045,028 tons moved in August a year ago. Season shipments through August total 57,695,824 tons, up 15,817,963 tons, compared with the 41,877,861 tons moved in the 1956 season through August.

Shipments of Lake Superior iron ore in the week ended Sept. 9 totaled 2,720,994 gross tons, reports the American Iron Ore Association. This was an increase of 104,707 tons, compared with the movement in the like week a year ago.

Total shipments in the 1957 navigation season to Sept. 9 were 60,990,061 tons, up 16,051,817 tons, compared with the tonnage moved to that date in 1956.

An earlier than usual layup of some lake ore vessels is expected. Bethlehem Steel recently laid up two of its freighters. It still has nine in operation.

The lake ore trade has had fa-



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In Canada: Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario

vorable sailing weather this season, and vessels have been operated without strike interruptions. Pressure for winter supplies is less in evidence than it has been for several years.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 210

Beehive coke operations at Leisenring No. 2 mine of U. S. Steel Corp.'s Coal Div., will be closed down indefinitely beginning Oct. 1. Increased coke production at the Clairton Works eliminates the need for producing beehive coke at Leisenring. One modern rebuilt byproduct coke battery went into production a week ago at the Clairton Works, and two additional batteries are scheduled to be placed in operation by the end of the year.

The Leisenring plant, founded in 1881 by the Connellsville Coke & Iron Co., was purchased by the H. C. Frick Coke Co. in 1890. The 496-oven plant continued operation until January, 1927, when production was discontinued. The plant was rehabilitated in February, 1943, and was in operation until June, 1949. Production was resumed again in March, 1950, and the plant operated until January, 1954. In December, 1955, operations were again resumed, using coal trucked in from the Leisenring No. 3 mine.

Pig Iron . . .

Pig Iron Prices, Page 208

Activity in the foundry industry is spotty and below expectations in many districts. So demand for pig iron this month is not living up to estimates.

Market interests believe it will be Oct. 1 before fourth quarter business in pig iron can be appraised. The trade is counting on improved demand from foundries to assert itself early that month.

Demand is being adversely affected by the decline in scrap prices since this development, following the recent hike in iron prices, is prompting many foundries to use more scrap than pig iron in their melts. This is substantiated by the fact that sales of cast scrap have held up well during the summer.

Auto producers are not buying castings in large volume. Auto manufacturers who buy merchant iron for their own foundries have sizable stockpiles and won't need much tonnage right away. This is especially true of General Motors' foundries.

The appliance industry continues slow, and demand for castings for appliances is light. This is reflected in reduced demand for merchant iron.

In New England the situation is somewhat brighter. Shipments of iron to foundries are heavier this month, with some shops taking tonnage for the first time since spring. Jobbing shops' operating schedules are back to or slightly higher than those maintained during the first half of the year. Their order backlogs are small except those held by steel casting producers.

Most New England shops have renewed their contract agreements with Mystic Iron Works, Everett, Mass., for five years. The old contracts expired at midyear, and new

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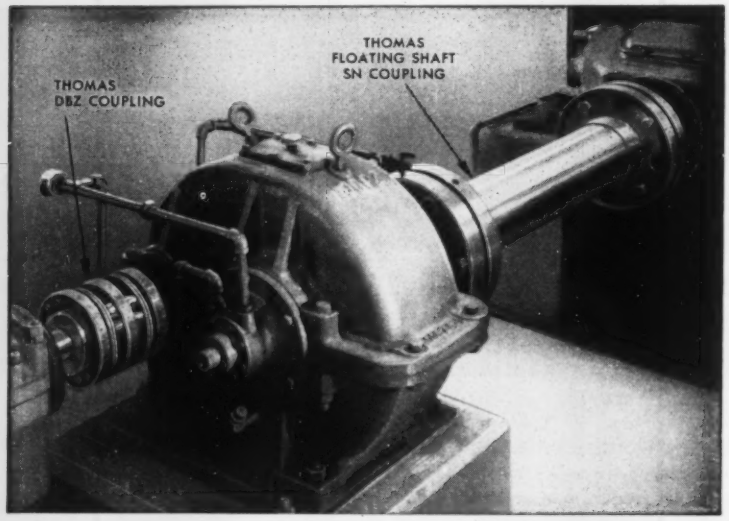

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arrangements are basically the same. Prices will be fixed quarterly, based on costs at the Everett furnace in the previous quarter.

Of the Chicago district's 43 blast furnaces, 38 are in operation. Inland Steel Co. relighted its No. 2 Indiana Harbor (Ind.) furnace Sept. 8 following relining and repairs. Late this month Inland will blow out its No. 4 furnace for relining and repairs. Wisconsin Steel Div., International Harvester Co., will bank its No. 2 furnace at South Chicago, Ill., Sept. 15.

Ferroalloys . . .

Domestic production of silicon alloys and metal during the second quarter this year increased 5 per cent; shipments were 2 per cent lower than they were in the first quarter, reports the U. S. Bureau of Mines. Apparent consumption (shipments plus imports, minus exports) was about 2 per cent below that of the first quarter.

Second quarter shipments (silvery pig iron, ferrosilicon, silicon briquets, silicon metal, and miscellaneous silicon alloys) were 197,325 tons, against 201,577 in the first quarter; imports were 5931 tons, against 4945; exports were 812 tons, against 757; apparent consumption was 202,444 tons, against 205,765 tons.

Imports of ferrosilicon in the second quarter totaled 5931 short tons containing 1112 tons of silicon, valued at $497,000. Exports amounted to 812 tons valued at $199,916.

Structural Shapes . . .

Structural Shape Prices, Page 202

Pressure on the structural fabricators continues to ease. Bridge work continues to be prominent in the market picture, highway construction playing a big role in over-all steel demand. The trend even in this area is down and demand will slacken steadily as the building season advances.

Fabricating shops continue to hold fair order backlogs. But these are shrinking as new business is not developing sufficiently to offset completions. The situation is resulting in sharper competition on new work than was the case a year ago.

Improved supplies of steel are enabling fabricators to bid more actively and on a wider scale than had been their custom until comparatively recently. Wide flange sections remain scarce, but there is noticeable softening in supplies of standard structurals.

Steel is more plentiful in the Pacific Northwest than it was some time back and this is being reflected in increased competition among fabricators in the area. District fabricators have fair backlogs, but new demand is definitely slower. Bethlehem Pacific Coast Steel Corp. recently booked 750 tons for a Portland, Oreg., bank building addition, and 675 tons are pending for a bridge in Rainier National Park, Washington.

Phoenix Iron & Steel Co., Phoenixville, Pa., suspended production on its structural mills for the first two weeks of this month. The company's structural fabricat-

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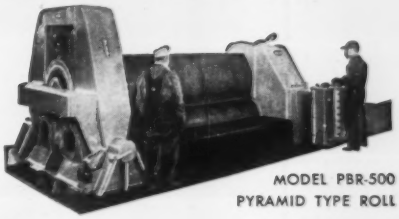
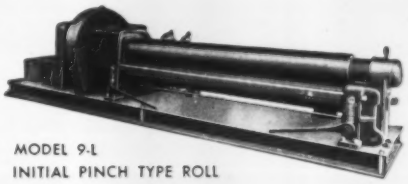
PLATE BENDING ROLLS

The Webb Corporation offers a complete line of Plate Bending Rolls for the rolling of the thinnest plate up to plate 2½" thick. Offered in a variety of lengths and thicknesses. Constructed for the modern fabricating shop.



MODEL PBR-500
PYRAMID TYPE ROLL



MODEL 9-L
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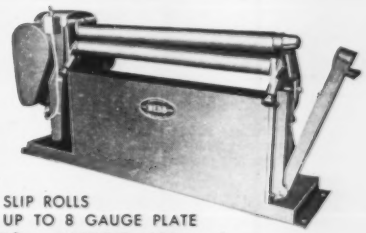
SLIP ROLLS

A complete line of small Sheet Metal Forming Rolls are also available. All power-driven with shaft sizes 3" to 5" for the handling of the thinnest gauge material, up to 8 gauge material. Special rolls for the forming of polished sheets, aluminum and stainless steels can be furnished. Complete catalogues on any size machine furnished upon request; write Dept. D.



SLIP ROLLS
UP TO 8 GAUGE PLATE

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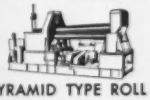
SLIP ROLLS



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Since 1881 THE WEBB® CORP.
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ing shops and tube mill remained in operation.

Phoenix continues to quote structural shapes on the premium basis of $5.50, f.o.b. mill.

New structural fabricating orders are dropping in the Midwest, partly for seasonal reasons and partly because boom demand is tapering off. Shapes and heavy plates are still in tight supply in the area, and there are pretty solid indications that condition will hold into 1958.

St. Louis Area Mills Busier

Cold-rolled sheet producers at St. Louis report improving demand as automotive business picks up in other areas. They say the withdrawal of competitors from their market is diverting more orders to them.

They are booking better volume business from nearly all types of midwest fabricators, especially farm implement manufacturers. Demand from stove and other household appliance makers continues slow, except washing machines.

Demand for strip in ½ to 12-in widths is showing sufficient improvement to enable St. Louis area mills to increase production. The faster tempo will be maintained from six to eight weeks on the basis of present bookings. District producers report a general pickup in demand from all classes of consumers. They predict that September's volume will be better than August's. Most mills have orders extending into October.

Completing New Tube Mill

Youngstown Sheet & Tube Co. plans to begin operations at its new seamless tube mill in the Chicago District about Oct. 1. The mill is considered one of the most modern in the industry—it will employ about 300. Sheet & Tube now has two seamless mills at its Campbell Works in Youngstown.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2500 tons, lock and dam 41, Ohio River, Louisville; bids out for December, Corps of U. S. Engineers.

750 tons, addition to the First National Bank, Portland, Oreg., to the Bethlehem Pacific Coast Steel Corp., Seattle; Hoffman Construction Co., Portland, general contractor.

115 tons, foundry addition, Texas Electrical Steel Castings Co., Houston, to Metallic Building Co., Houston; Brown & Root Inc., Houston, general contractor.

195 tons, grade separation over Connecticut Turnpike, East Lyme, Conn., to the Bethlehem Steel Co., Bethlehem, Pa., through L. G. De Falice & Son Inc., North Haven, Conn., general contractor.

125 tons, spillway bridge, Stevenson, Conn., to Morris Wheeler & Co., Philadelphia, through United Engineers & Constructors Inc., Philadelphia.

STRUCTURAL STEEL PENDING

675 tons, 735-ft steel girder bridge, Nisqually River, Washington State, to Carl M. Halvorson Inc., Portland, Oreg., low at $1,164,188 to the Bureau of Public Roads.

250 tons, 527-ft steel truss, Rogue River, Oreg.; Tom Lillebo, Reedsport, Oreg., low at $243,464 to the Bureau of Public Roads.

REINFORCING BARS . . .

REINFORCING BARS PLACED

177 tons, Washington state highway project, Whatcom County, to the Soule Steel Co., Seattle; Wilder Construction Co., Bellingham, Wash., is general contractor.

170 tons, 280-ft overcrossing, Montana state project, Beaverhead County, to the Bethlehem Pacific Coast Steel Corp., Seattle; C. B. Lauch Construction Co., Great Falls, Mont., is low at $148,617 on general contract.

REINFORCING BARS PENDING

100 tons, Washington state road projects, Pierce and Stevens Counties; bids to Olympia, Wash., Sept. 24.

PLATES . . .

PLATES PLACED

500 tons, 2-million-gal tank, Richland Highlands district, Seattle, to the Pittsburgh-Des Moines Steel Co., Seattle, low at $270,215.

325 tons, tank and pipe, Rockwood Water District, Portland, Oreg., to Gunderson Bros. Engineering Co., Portland, Oreg.

300 tons, 36 and 24-in. water pipe, for the Port of Tacoma (Wash.), to the Hydraulic Supply Mfg. Co., Seattle, at $110,204.

200 tons, water supply project, McChord Air Field, Washington state; general contract to Milone & Tucci, Tacoma, Wash., low at $334,424.

PLATES PENDING

3000 tons, two 300,000-gal welded steel tanks, veterans hospital, McKinney, Tex.; bids Oct. 8, Veterans Administration, Washington.

200 tons, steel reservoir, Rockwood district, Portland, Oreg.; Gunderson Bros. Engineering Co., Portland, Oreg., is low base at $109,200; American Pipe & Construction Co., Portland, is low on alternative bid at $103,955.

115 tons, low-alloy, high-strength, annealed, Air Force depot, Topeka, Kans.

100 tons, steel tanks and 54,000 ft of 8 and 4-in. pipe; bids to Grays Harbor District No. 2, Montesano, Wash., Sept. 10.

Unstated, two steel ferries, estimated cost $2.6 million each; bids restricted to state contractors, to Washington Toll Bridge Authority, Olympia, Wash., Oct. 15.

PIPE . . .

CAST IRON PIPE PENDING

500 tons, assorted sizes; bids soon to Portland, Oreg.

240 tons, three state highway bridges, Montpelier, Vt., S. V. Rossi Construction Co. Inc., Torrington, Conn., low on general contract.

200 tons, takeoff structure, Rocky Reach project; bids to PUD No. 1, Wenatchee, Wash., Sept. 27.

100 tons, bridge near Forks, Wash., for the Bureau of Public Roads; Poole, McGonigle & Dick, Portland, Oreg., reported low on subcontract.

Imported Steel

Prices per 100 lbs. (except where otherwise noted) landed, including customs duty, but no other taxes.

	Atlantic & Gulf Coast	West Coast	Vancouver	Montreal
Deformed Bars (⅜" Dia. incl. all extras)	$6.78	$7.01	$6.76	$6.44
Merchant Bars (¼" Round incl. all extras)	7.62	7.85	7.48	7.22
Bands (1"x⅛"x20' incl. all extras)	7.76	7.98	7.65	7.38
Angles (2"x2"x¼" incl. all extras)	6.57	6.75	6.99	6.69
Beams & Channels (base)	6.82	7.00	7.24	6.94
Furring Channels (C.R. ¾", per 1000')	26.62	27.77	....	....
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.38	8.58	9.07	8.99
Larssen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's, bright, low C, (11½ga.)	7.38	7.52	8.52	8.52
Wire, galvanized, low C, (11½ ga.)	8.01	8.15	9.42	9.42
Wire, Merchant quality, bl. ann., (10 ga.)	7.60	7.75	8.78	8.78
Rope Wire (.045", 247,000 PSI, incl. extras)	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C, (20 ga.)	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14G, 97 lbs. net)	9.58	9.73	9.64	9.54
Merchant Pipe (½" galv. T & C, per 100')	8.48	8.83	....	....
Casing (5½", 15.5 J55, T & C, per 100')	194.00	199.00	....	....
Tubing (2⅞", 6.4 J55, EUE, per 100')	103.00	104.00	....	....
Forged R Turn. Bars, C-1035 (from 10" di.)	14.00	14.23	14.00	13.74

Ask prices on: Bulb tees, bolts and nuts, manganese steel plates and shapes, welded wire reinforcing mesh and hardware cloth, boiler tubes, A-335-P11 pressure pipe.

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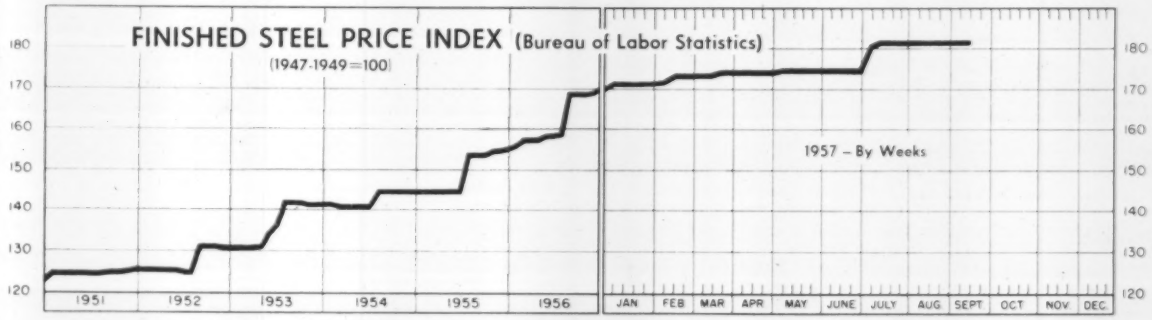
Price Indexes and Composites



Sept. 10, 1957	Week Ago	Month Ago	Aug. Avg.	Year Ago
181.5	181.5	181.5	181.5	168.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.600
Rails, Light, 40 lb	7.067
Tie Plates	6.600
Axles, Railway	9.825
Wheels, Freight Car, 33 in. (per wheel)	60.000
Plates, Carbon	6.150
Structural Shapes	5.942
Bars, Tool Steel, Carbon (lb)	0.480
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769
Bars, H.R., Alloy	10.525
Bars, H.R., Stainless, 303 (lb)	0.525
Bars, H.R., Carbon	6.425
Bars, Reinforcing	6.210
Bars, C.F., Carbon	10.360
Bars, C.F., Alloy	13.875
Bars, C.F., Stainless, 302 (lb)	0.553
Sheets, H.R., Carbon	6.192
Sheets, C.R., Carbon	7.089
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.688
Sheets, Electrical	12.025
Strip, C.R., Carbon	9.193
Strip, C.R., Stainless, 430 (lb)	0.493
Strip, H.R., Carbon	6.245
Pipe, Black, Buttweld (100 ft)	19.814
Pipe, Galv., Buttweld (100 ft)	23.264
Pipe, Line (100 ft)	199.023
Casing, Oil Well, Carbon (100 ft)	194.499
Casing, Oil Well, Alloy (100 ft)	304.610
Tubes, Boiler (100 ft)	49.130
Tubing, Mechanical, Carbon (100 ft)	24.953
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
Tin Plate, Electrolytic 0.25 lb (95 lb base box)	8.483
Black Plate, Canmaking Quality (95 lb base box)	7.583
Wire, Drawn, Carbon	10.225
Wire, Drawn, Stainless, 430 (lb)	0.653
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common	9.828
Wire, Barbed (80-rod spool)	8.719
Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Sept. 11 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	225.71	181.40
Index in cents per lb	6.479	6.479	6.479	6.114	4.914

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$146.19	$146.19	$146.19	$137.75	$111.66
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT	50.17	51.83	53.83	59.67	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Sept. 11 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.715	4.93	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.525	5.00	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.50	5.50	5.50	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.75-4.00
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-5.60
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	4.85-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.35	5.90-6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.85	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.15	6.15	6.15	5.80	4.325

PIG IRON, Gross Ton	Sept. 11 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.01	70.01	69.88	66.26	59.25
No. 2 Fdry, NevilleIsland,Pa	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila.	70.51	70.51	70.38	66.76	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm. deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	215.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$51.50	$53.50	$55.00	$58.50	$44.00
No. 1 Heavy melt, E. Pa.	48.00	51.00	52.00	59.00	41.50
No. 1 Heavy Melt, Chicago	51.00	51.00	54.00	61.50	42.50
No. 1 Heavy Melt, Valley	52.50	54.50	55.50	65.50	44.00
No. 1 Heavy Melt, Cleve.	49.50	51.50	52.50	63.00	43.00
No. 1 Heavy Melt, Buffalo	47.50	49.50	49.50	56.50	43.00
Rails, Rerolling, Chicago	65.50	67.50	76.50	84.50	52.50
No. 1 Cast, Chicago	44.50	44.50	47.50	53.50	50.00

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.25	$15.25	$15.25	$14.50	$14.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	17.50	17.00

Steel Prices

Mill prices as reported to STEEL, Sept. 11, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 203; to footnotes, page 205.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ..... $73.50

INGOTS, Alloy (NT)
Detroit S41 ..... $77.00
Farrell,Pa. S3 ..... 77.00
Lowellville,O. S3 ..... 77.00
Midland,Pa. C18 ..... 77.00
Munhall,Pa. U5 ..... 77.00
Sharon,Pa. S3 ..... 77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 .... $77.50
Bridgeport,Conn. N19 .. 80.50
Buffalo R2 ..... 77.50
Clairton,Pa. U5 ..... 77.50
Ensley,Ala. T2 ..... 77.50
Fairfield,Ala. T2 ..... 77.50
Fontana,Calif. K1 .... 88.00
Gary,Ind. U5 ..... 77.50
Johnstown,Pa. B2 .... 77.50
Lackawanna,N.Y. B2 .. 77.50
Munhall,Pa. U5 ..... 77.50
S.Chicago,Ill. R2, U5 .. 77.50
S.Duquesne,Pa. U5 .... 77.50
Sterling,Ill. N15 ..... 77.50
Youngstown R2 ..... 77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 .... $96.00
Bridgeport,Conn. N19 .. 101.00
Buffalo R2 ..... 96.00
Canton,O. R2 ..... 98.50
Clairton,Pa. U5 ..... 96.00
Conshohocken,Pa. A3 .. 101.00
Ensley,Ala. T2 ..... 96.00
Fairfield,Ala. T2 ..... 96.00
Fontana,Calif. K1 .... 105.50
Gary,Ind. U5 ..... 96.00
Geneva,Utah C11 ..... 96.00
Houston S5 ..... 101.00
Johnstown,Pa. B2 .... 96.00
Lackawanna,N.Y. B2 .. 96.00
LosAngeles B3 ..... 105.50
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 96.00
Seattle B3 ..... 109.50
Sharon,Pa. S3 ..... 96.00
S.Chicago R2,U5,W14 .. 96.00
S.Duquesne,Pa. U5 .... 96.00
S.SanFrancisco B3 .... 105.50
Warren,O. C17 ..... 96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ... $114.00
Bridgeport,Conn. N19 .. 114.00
Buffalo R2 ..... 114.00
Canton,O. R2, T7 .... 114.00
Conshohocken,Pa. A3 .. 121.00
Detroit S41 ..... 114.00
Farrell,Pa. S3 ..... 114.00
Fontana,Calif. K1 .... 135.00
Gary Ind. U5 ..... 114.00
Houston S5 ..... 119.00
Ind.Harbor,Ind. Y1 .. 114.00
Johnstown,Pa. B2 .... 114.00
Lackawanna,N.Y. B2 .. 114.00
LosAngeles B3 ..... 134.00
Lowellville,O. S3 .... 114.00
Massillon,O. R2 ..... 114.00
Midland,Pa. C18 ..... 114.00
Munhall,Pa. U5 ..... 114.00
Sharon,Pa. S3 ..... 114.00
S.Chicago R2 U5,W14 .. 114.00
S.Duquesne,Pa. U5 .. 114.00
Struthers,O. Y1 ..... 114.00
Warren,O. C17 ..... 114.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $122.50
Buffalo R2 ..... 117.50
Canton,O. R2 ..... 120.00
Cleveland,O. R2 ..... 117.50
Gary,Ind. U5 ..... 117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 .. 117.50
Warren,O. C17 ..... 117.50

SKELP
Aliquippa,Pa. J5 ..... 5.075
Munhall,Pa. U5 ..... 4.875
Warren,O. R2 ..... 4.875
Youngstown R2, U5 .. 4.875

WIRE RODS
AlabamaCity,Ala. R2 .. 6.15
Aliquippa,Pa. J5 ..... 6.15
Alton,Ill. L1 ..... 6.35
Buffalo W12 ..... 6.15
Cleveland A7 ..... 6.15
Donora,Pa. A7 ..... 6.15
Fairfield,Ala. T2 ..... 6.15
Houston S5 ..... 6.40
IndianaHarbor,Ind. Y1.. 6.15
Johnstown,Pa. B2 ..... 6.15
Joliet Ill. A7 ..... 6.15
KansasCity,Mo. S5 ..... 6.40
Kokomo,Ind. C16 ..... 6.25
LosAngeles B3 ..... 6.95
Minnequa,Colo. C10 .... 6.40
Monessen,Pa. P17 ..... 6.15
N.Tonawanda,N.Y. B11.. 6.15
Pittsburg,Calif. C11 .... 6.95
Portsmouth,O. P12 ..... 6.15
Roebling,N.J. R5 ..... 6.25
S.Chicago,Ill. R2 ..... 6.15
SparrowsPoint,Md. B2 .. 6.25
Sterling,Ill.(1) N15 .... 6.15
Sterling,Ill. N15 ..... 6.25
Struthers,O. Y1 ..... 6.15
Worcester,Mass. A7 .... 6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 ..... 5.275
Atlanta A11 ..... 5.475
Aliquippa,Pa. J5 ..... 5.275
Bessemer,Ala. T2 ..... 5.275
Bethlehem,Pa. B2 ..... 5.325
Birmingham C15 ..... 5.275
Clairton,Pa. U5 ..... 5.275
Fairfield,Ala. T2 ..... 5.275
Fontana,Calif. K1 ..... 6.075
Gary,Ind. U5 ..... 5.275
Geneva,Utah C11 ..... 5.275
Houston S5 ..... 5.375
Ind.Harbor,Ind. I-2 .... 5.275
Johnstown,Pa. B2 ..... 5.325
Joliet,Ill. P22 ..... 5.275
KansasCity,Mo. S5 .... 5.375
Lackawanna,N.Y. B2.. 5.325
LosAngeles B3 ..... 5.975
Minnequa,Colo. C10 .... 5.575
Munhall,Pa. U5 ..... 5.275
Niles,Calif. P1 ..... 5.925
Phoenixville,Pa. P4 .... 5.50
Portland,Oreg. O4 .... 6.025
Seattle B3 ..... 6.025
S.Chicago,Ill. U5, W14.. 5.275
S.SanFrancisco B3 .... 5.925
Sterling,Ill. N15 ..... 5.275
Torrance,Calif. C11 .... 5.975
Weirton,W.Va. W6 .... 5.275

Wide Flange
Bethlehem,Pa. B2 ..... 5.325
Clairton,Pa. U5 ..... 5.275
Fontana,Calif. K1 .... 6.225
IndianaHarbor,Ind. I-2.. 5.525
Lackawanna,N.Y. B2 .. 5.325
Munhall,Pa. U5 ..... 5.275
Phoenixville,Pa. P4 .... 5.50
S.Chicago,Ill. U5 ..... 5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 ..... 6.55
Clairton,Pa. U5 ..... 6.55
Gary,Ind. U5 ..... 6.55
Houston S5 ..... 6.65
KansasCity,Mo. S5 .... 6.65
Munhall,Pa. U5 ..... 6.55
S.Chicago,Ill. U5 ..... 6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 ..... 7.75
Bessemer,Ala. T2 ..... 7.75
Bethlehem,Pa. B2 ..... 7.80
Clairton,Pa. U5 ..... 7.75
Fairfield,Ala. T2 ..... 7.75
Fontana,Calif. K1 ..... 8.55
Gary,Ind. U5 ..... 7.75
Geneva,Utah C11 ..... 7.75
Houston S5 ..... 7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 ..... 7.80
KansasCity,Mo. S5 .... 7.85
Lackawanna,N.Y. B2 .. 7.80
LosAngeles B3 ..... 8.45
Munhall,Pa. U5 ..... 7.75
Seattle B3 ..... 8.50
S.Chicago,Ill. U5, W14.. 7.75
S.SanFrancisco B3 .... 8.40
Struthers,O. Y1 ..... 7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ..... 7.80
Lackawanna,N.Y. B2 .. 7.80
Munhall,Pa. U5 ..... 7.75
S.Chicago,Ill. U5 ..... 7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ..... 5.325
Lackawanna,N.Y. B2 .. 5.325
Munhall,Pa. U5 ..... 5.275
S.Chicago,Ill. U5 ..... 5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 .. 6.225
Munhall,Pa. U5 ..... 6.225
S.Chicago,Ill. U5 ..... 6.225

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 ..... 5.10
Aliquippa,Pa. J5 ..... 5.10
Ashland,Ky.(15) A10 .. 5.10
Bessemer,Ala. T2 ..... 5.10
Clairton,Pa. U5 ..... 5.10
Claymont,Del. C22 ..... 5.70
Cleveland J5, R2 ..... 5.20
Coatesville,Pa. L7 ..... 5.50
Conshohocken,Pa. A3 .. 5.20
Ecorse,Mich. G5 ..... 5.20
Fairfield,Ala. T2 ..... 5.10
Fontana,Calif.(30) K1 .. 5.90
Gary,Ind. U5 ..... 5.10
Geneva,Utah C11 ..... 5.10
GraniteCity,Ill. G4 .... 5.30
Harrisburg,Pa. P4 ..... 5.80
Houston S5 ..... 5.20
Ind.Harbor,Ind. I-2, Y1.. 5.10
Johnstown,Pa. B2 ..... 5.10
Lackawanna,N.Y. B2 .. 5.10
LoneStar,Tex. L6 ..... 5.45
Mansfield,O. E6 ..... 5.10
Minnequa,Colo. C10 .... 5.95
Munhall,Pa. U5 ..... 5.10
Newport,Ky. A2 ..... 5.10
Pittsburgh J5 ..... 5.10
Riverdale,Ill. A1 ..... 5.10
Seattle B3 ..... 6.00
Sharon,Pa. S3 ..... 5.10
S.Chicago,Ill. U5, W14.. 5.10
SparrowsPoint,Md. B2 .. 5.10
Sterling,Ill. N15 ..... 5.10
Steubenville,O. W10 .... 5.10
Warren,O. R2 ..... 5.10
Youngstown R2, U5, Y1.. 5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ..... 7.35
Fontana,Calif. K1 ..... 7.55
Geneva,Utah C11 ..... 6.75
Johnstown,Pa. B2 ..... 7.00
SparrowsPoint,Md. B2 .. 7.00

PLATES, Wrought Iron
Economy,Pa. B14 ..... 13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ..... 7.625
Bessemer,Ala. T2 ..... 7.625
Clairton,Pa. U5 ..... 7.625
Claymont,Del. C22 .... 7.625
Cleveland J5, R2 ..... 7.625
Coatesville,Pa. L7 .... 7.925
Conshohocken,Pa. A3 .. 7.625
Ecorse,Mich. G5 ..... 7.725
Fairfield,Ala. T2 ..... 7.625
Farrell,Pa. S3 ..... 7.625
Fontana,Calif.(30) K1.. 8.425
Gary,Ind. U5 ..... 7.625
Geneva,Utah C11 ..... 7.625
Houston S5 ..... 7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 ..... 7.625
Lackawanna,N.Y. B2 .. 7.625
Munhall,Pa. U5 ..... 7.625
Pittsburgh J5 ..... 7.625
Seattle B3 ..... 8.525
Sharon,Pa. S3 ..... 7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2.. 7.625
Warren,O. R2 ..... 7.625
Youngstown U5 ..... 7.625

PLATES, Alloy
Aliquippa,Pa. J5 ..... 7.20
Claymont,Del. C22 ..... 7.20
Coatesville,Pa. L7 ..... 7.20
Farrell,Pa. S3 ..... 7.20
Fontana,Calif.(30) K1 .. 8.00
Gary,Ind. U5 ..... 7.20
Houston S5 ..... 7.30
Ind.Harbor,Ind. Y1 .... 7.20
Johnstown,Pa. B2 ..... 7.20
Lowellville,O. S3 ..... 7.20
Munhall,Pa. U5 ..... 7.20
Newport,Ky. A2 ..... 7.20
Pittsburgh J5 ..... 7.20
Seattle B3 ..... 8.10
Sharon,Pa. S3 ..... 7.20
S.Chicago,Ill. U5, W14.. 7.20
SparrowsPoint,Md. B2.. 7.20
Youngstown Y1 ..... 7.20

FLOOR PLATES
Cleveland J5 ..... 6.175
Conshohocken,Pa. A3 .. 6.175
Ind.Harbor,Ind. I-2 .... 6.175
Munhall,Pa. U5 ..... 6.175
S.Chicago,Ill. U5 ..... 6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10.. 5.35
Ashland l.c.l. (15) A10.. 5.85
Cleveland c.l. R2 ..... 5.85
Warren,O. c.l. R2 ..... 5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 .. 5.425
Aliquippa,Pa.(9) J5 .... 5.425
Alton Ill. L1 ..... 5.625
Atlanta(9) A11 ..... 5.625
Bessemer,Ala.(9) T2 .. 5.425
Birmingham(9) C15 .... 5.425
Bridgeport,Conn.(9) N19 5.65
Buffalo(9) R2 ..... 5.425
Clairton,Pa.(9) U5 .... 5.425
Cleveland(9) R2 ..... 5.425
Ecorse,Mich.(9) G5 .... 5.525
Emeryville,Calif. J7 ... 6.175
Fairfield,Ala.(9) T2 ... 5.425
Fairless,Pa.(9) U5 .... 5.575
Fontana,Calif.(9) K1 .. 6.125
Gary,Ind.(9) U5 ..... 5.425
Houston(9) S5 ..... 5.675
Ind.Harbor(9) I-2, Y1.. 5.425
Johnstown,Pa.(9) B2 .. 5.425
Joliet,Ill. P22 ..... 5.425
KansasCity,Mo.(9) S5.. 5.675
Lackawanna(9) B2 .... 5.425
LosAngeles(9) B3 ..... 6.125
Milton,Pa. M18 ..... 5.575
Minnequa,Colo. C10 .... 5.875
Niles,Calif. P1 ..... 6.125
N.T'wanda,N.Y.(46)B11 5.775
Pittsburg,Calif.(9) C11.. 6.125
Pittsburgh(9) J5 ..... 5.425
Portland,Oreg. O4 .... 6.175
Seattle B3, N14 ..... 6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5.. 5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15.. 5.425
Sterling,Ill.(9) N15 .... 5.525
Struthers,O. Y1 ..... 5.425
Tonawanda,N.Y. B12 .. 5.425
Torrance,Calif.(9) C11.. 6.125
Youngstown(9) R2, U5.. 5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 ..... 7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.475
Bethlehem,Pa. B2 ..... 6.475
Bridgeport,Conn. N19 .. 6.55
Buffalo R2 ..... 6.475
Canton,O. R2, T7 .... 6.475
Clairton,Pa. U5 ..... 6.475
Detroit S41 ..... 6.475
Ecorse,Mich. G5 ..... 6.575
Fairless,Pa. U5 ..... 6.625
Farrell,Pa. S3 ..... 6.475
Fontana,Calif. K1 .... 7.525
Gary,Ind. U5 ..... 6.475
Houston S5 ..... 6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 .... 6.475
KansasCity,Mo. S5 .... 6.725
Lackawanna,N.Y. B2 .. 6.475
Lowellville,O. S3 ..... 6.475
LosAngeles B3 ..... 7.525
Massillon,O. R2 ..... 6.475
Midland,Pa. C18 ..... 6.475
Pittsburgh J5 ..... 6.475
Sharon,Pa. S3 ..... 6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 .... 6.475
Struthers,O. Y1 ..... 6.475
Warren,O. C17 ..... 6.475
Youngstown U5 ..... 6.475

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 7.925
Bessemer,Ala. T2 ..... 7.925
Bethlehem,Pa. B2 ..... 7.925
Bridgeport,Conn. N19 .. 7.95
Clairton,Pa. U5 ..... 7.925
Cleveland R2 ..... 7.925
Ecorse,Mich. G5 ..... 8.025
Fairfield,Ala. T2 ..... 7.925
Fontana,Calif. K1 .... 8.625
Gary,Ind. U5 ..... 7.925
Houston S5 ..... 8.175
Ind.Harbor,Ind. Y1 .... 7.925
Johnstown,Pa. B2 ..... 7.925
KansasCity,Mo. S5 .... 8.175
Lackawanna,N.Y. B2.. 7.925
LosAngeles B3 ..... 8.625
Pittsburgh J5 ..... 7.925
Seattle B3 ..... 8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 .... 7.925
S.SanFrancisco B3 .... 8.675
Struthers,O. Y1 ..... 7.925
Youngstown U5 ..... 7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 .. 5.575
Houston(9) S5 ..... 5.675
KansasCity,Mo.(9) S5.. 5.675
Lackawanna(9) B2 .... 5.425
Sterling,Ill. N15 ..... 5.525
Sterling,Ill.(1) N15 .. 5.425
Tonawanda,N.Y. B12 .. 5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ..... 5.425
Atlanta A11 ..... 5.625
Joliet,Ill. P22 ..... 5.425
Niles,Calif. P1 ..... 6.125
Pittsburgh J5 ..... 5.425
Portland,Oreg. O4 .... 6.175
SanFrancisco S7 ..... 6.275
Seattle B3 ..... 6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.55
Clairton,Pa. U5 ..... 6.55
Gary,Ind. U5 ..... 6.55
Houston S5 ..... 6.80
KansasCity,Mo. S5 .... 6.80
Pittsburgh J5 ..... 6.55
Youngstown U5 ..... 6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ... 9.925
BeaverFalls,Pa. M12 .. 9.925
Camden,N.J. P13 .... 10.10
Chicago W18 ..... 9.925
Cleveland C20 ..... 9.925
LosAngeles P2, S30
(Grade A) 11.30
(Grade B) 11.80
Monaca,Pa. S17 ..... 9.925
Newark,N.J. W18 .... 10.10
SpringCity,Pa. K3 .... 10.10
Warren,O. C17 ..... 9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .... 7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 ..... 7.90
Bridgeport,Conn. N19 .. 7.65
Buffalo B5 ..... 7.30
Camden,N.J. P13 ..... 7.75
Carnegie,Pa. C12 ..... 7.30
Chicago W18 ..... 7.30
Cleveland A7, C20 .... 7.30
Detroit B5, P17 ..... 7.50
Detroit S41 ..... 7.30
Donora,Pa. A7 ..... 7.30
Elyria,O. W8 ..... 7.30
FranklinPark,Ill. N5 .. 7.30
Gary,Ind. R2 ..... 7.30
GreenBay,Wis. F7 ..... 7.30
Hammond,Ind. J5, L2 .. 7.30
Hartford,Conn. R2 ..... 7.80
Harvey,Ill. B5 ..... 7.30
LosAngeles P2, S30 .... 8.75
LosAngeles R2 ..... 8.75
Mansfield Mass. B5 .... 7.85
Massillon,O. R2, R8 .... 7.30
Midland,Pa. C18 ..... 7.30
Monaca,Pa. S17 ..... 7.30
Newark,N.J. W18 ..... 7.75
NewCastle,Pa.(17) B4 .. 7.30
Pittsburgh J5 ..... 7.30
Plymouth Mich. P5 .... 7.55
Putnam,Conn. W18 .... 7.85
Readville,Mass. C14 .... 7.85
S.Chicago,Ill. W14 .... 7.30
SpringCity,Pa. K3 .... 7.75
Struthers,O. Y1 ..... 7.30
Warren,O. C17 ..... 7.30
Willimantic,Conn. J5 ... 7.80
Waukegan,Ill. A7 ..... 7.30
Youngstown F3, Y1 .... 7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.. 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .... 8.775
BeaverFalls,Pa. M12,R2 8.775
Bethlehem,Pa. B2 .... 8.775
Bridgeport,Conn. N19 .. 8.925
Buffalo B5 ..... 8.775
Camden,N.J. P13 ..... 8.95
Canton,O. T7 ..... 8.775
Carnegie,Pa. C12 ..... 8.775
Chicago W18 ..... 8.775
Cleveland A7, C20 .... 8.775
Detroit B5, P17 ..... 8.975
Detroit S41 ..... 8.775
Donora,Pa. A7 ..... 8.775
Elyria,O. W8 ..... 8.775
FranklinPark,Ill. N5 .. 8.775
Gary,Ind. R2 ..... 8.775
GreenBay,Wis. F7 ..... 8.775
Hammond,Ind. J5, L2.. 8.775
Hartford,Conn. R2 .... 9.075
Harvey,Ill. B5 ..... 8.775
Lackawanna,N.Y. B2 .. 8.775
LosAngeles P2, S30 .. 10.65
Mansfield,Mass. B5 ... 9.075
Massillon,O. R2, R8 .. 8.775
Midland,Pa. C18 ..... 8.775
Monaca,Pa. S17 ..... 8.775
Newark N.J. W18 ..... 8.95
Plymouth,Mich. P5 ... 8.975
S.Chicago W14 ..... 8.775
SpringCity,Pa. K3 ..... 8.95
Struthers,O. Y1 ..... 8.775
Warren,O. C17 ..... 8.775
Waukegan,Ill. A7 .... 8.775
Worcester,Mass. A7 ... 9.075
Youngstown F3, Y1 .. 8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.425
Atlanta A11 .....5.625
Birmingham C15, S42 ..5.425
Bridgeport,Conn. N19 ...5.65
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary, Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ....5.675
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ...6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2..5.425
Sterling,Ill.(1) N15 ...5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ...6.00
Torrance,Calif. C11 ....6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.56
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 .....7.08
KansasCity,Mo. S5 .....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Pittsburgh J5, U8 ....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ....7.08
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2..5.325
ChicagoHts.(4)(44) I-2..5.425
ChicagoHts.(4) C2 ....5.425
Ft.Worth,Tex.(26) T4..5.875
Franklin,Pa. (3) F5 ...5.325
Franklin,Pa.(4) F5 ...5.425
JerseyShore,Pa.(4) J8 ..5.30
Marion,O.(3) P11 .....5.325
Tonawanda(3) R12 .....5.325
Tonawanda (4) B12 ....6.00
Williamsport,Pa. (3)S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10....4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 ....4.925
Fairless, Pa. U5 .....4.975
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Geneva,Utah C11 .....5.025
Granite City,Ill.(8) G4..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 ....4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ....4.925
Niles,O. M21, S3 ....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2..4.925
Steubenville,O. W10 ...4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1..4.925

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ....8.10

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 ....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.175
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2..7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ....7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ...6.05
Fontana, Calif. K1 ....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 .....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ....7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 ....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ....6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville, O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse, Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ....10.275
Gary, Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna (37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	.....6.95	7.20
Gary,Ind. U5	....6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	...6.95	7.20
Irvin,Pa. U5	.....6.95	7.20
Kokomo,Ind. C16	..7.05	...
MartinsFry. W10	.6.95	7.20
Pitts.,Calif. C11	..7.70	...
Pittsburgh J5	....6.95	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.60‡
Ashland,Ky. A10 ....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ...6.80*
Ind.Harbor,Ind. I-2 ...6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 .....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown,O. A10 ...6.60†
Pittsburg,Calif. C11 ..7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ...6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ...9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.425
Niles,O.(28) R2 .....7.425
Weirton,W.Va. W6 ...7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1)..9.25
Butler,Pa. A10 (type 2)..9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2,Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.65
Ind.Harbor,Ind. I-2 ...8.475
Yorkville,O. W10 .....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 .....7.00
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allengheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calmuet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve.Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymount Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer.Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.925
Allenport,Pa. P7 .....4.925
Alton,Ill. L1 .....5.125
Ashland,Ky.(8) A10 ...4.925
Atlanta A11 .....5.125
Bessemer,Ala. T2 ....4.925
Birmingham C15 .....4.925
Buffalo(27) R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Ind.Harbor,Ind. I-2, Y1 4.925
Johnstown,Pa.(25) B2 .4.925
Lackawanna,N.Y.(25) B2 4.925
LosAngeles(25) B3 ....5.675
Minnequa,Colo. C10 ...6.025
Pittsburg,Calif. C11 ...5.675
Riverdale,Ill. A1 .....4.925
SanFrancisco S7 .....6.35
Seattle(25) B3 .....6.35
Seattle N14 .....6.35
Sharon,Pa. S3 .....4.925
S.SanFrancisco(25) B3 5.675
SparrowsPoint,Md. B2 4.925
Sterling,Ill.(1) N15 ..4.925
Sterling,Ill. N15 .....5.025
Torrance,Calif. C11 ...5.675
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5 .....4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.10
Farrell,Pa. S3 .....8.10
Gary,Ind. U5 .....8.10
Houston S5 .....8.35
Ind.Harbor,Ind. Y1 ....8.10
KansasCity,Mo. S5 ....8.35
LosAngeles B3 .....9.30
Lowellville,O. S3 .....8.10
Newport,Ky. A2 .....8.10
Sharon,Pa. S3 .....8.10
S.Chicago,Ill. W14 .....8.10
Youngstown U5, Y1 ....8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 .....7.325
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.425
Fairfield,Ala. T2 .....7.325
Farrell,Pa. S3 .....7.325
Gary,Ind. U5 .....7.325
Ind.Harbor,Ind. I-2, Y1 7.325
Lackawanna,N.Y. B2..7.325
LosAngeles(25) B3 ....8.075
Seattle(25) B3 .....8.325
Sharon,Pa. S3 .....7.325
S.Chicago,Ill. W14 ....7.325
S.SanFrancisco(25) B3..8.075
SparrowsPoint,Md. B2. 7.325
Warren,O. R2 .....7.325
Weirton,W.Va. W6 ....7.325
Youngstown U5, Y1 ...7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..5.175
Warren,O. R2 .....5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.15
Baltimore T6 .....7.15
Boston T6 .....7.70
Buffalo S40 .....7.15
Cleveland A7, J5 .....7.15
Conshohocken,Pa. A3 ..7.20
Dearborn,Mich. D3 ....7.25
Detroit D2, M1, P20 ....7.25
Dover,O. G6 .....7.15
Ecorse,Mich. G5 .....7.25
Evanston,Ill. M22 .....7.25
Follansbee,W.Va. F4 ...7.15
Fontana,Calif. K1 .....9.00
FranklinPark,Ill. T6 ..7.25
Ind.Harbor,Ind. Y1 ....7.15
Indianapolis J5 .....7.30
LosAngeles J5 .....9.05
LosAngeles C1 .....9.20
NewBedford, Mass. R10 .7.60
NewBritain(10) S15 ....7.15
NewCastle,Pa. B4, E5 ..7.15
NewHaven,Conn. D2 ...7.60
NewKensington,Pa. A6..7.15
Pawtucket,R.I. R3 .....7.80
Pawtucket,R.I. N8 ....7.70
Philadelphia(45) P24 ...7.70
Pittsburgh J5 .....7.15
Riverdale,Ill. A1 .....7.25
Rome,N.Y. (32) R6 ....7.15
Sharon,Pa. S3 .....7.15
Trenton,N.J.(31) R5 ...8.60
Wallingford,Conn. W2 ..7.60
Warren,O. R2, T5 ....7.15
Weirton,W.Va. W6 .....7.15
Worcester,Mass. A7 ....7.70
Youngstown J5, Y1 ....7.15

STRIP, Cold-Rolled Alloy

Boston T6 .....15.40
Carnegie,Pa. S18 .....15.05
Cleveland A7 .....15.25
Dover,O. G6 .....15.05
Farrell,Pa. S3 .....15.05
FranklinPark,Ill. T6 ..15.05
Harrison,N.J. C18 .....15.05
Indianapolis J5 .....15.20
Lowellville,O. S3 .....15.05
Pawtucket,R.I. N8 .....15.40
Riverdale,Ill. A1 .....15.05
Sharon,Pa. S3 .....15.05
Worcester,Mass. A7 ....15.55
Youngstown J5 .....15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.45
Dearborn,Mich. D3 ....10.60
Dover,O. G6 .....10.45
Ecorse,Mich. G5 .....10.55
Farrell,Pa. S3 .....10.50
Ind.Harbor,Ind. Y1 ....10.65
Sharon,Pa. S3 .....10.50
Warren,O. R2 .....10.45
Weirton,W.Va. W6 ....10.50
Youngstown Y1 .....10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover,O. G6 .....7.15*
Evanston,Ill. M22 ....7.25*
Riverdale,Ill. A1 .....7.25*
Warren,O. B9, T5 ....7.15*
Worcester,Mass. A7 ...7.70*
Youngstown J5 .....7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....7.275

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Riverdale, Ill. A1 .....5.50
Sharon,Pa. S3 .....5.35
Youngstown U5 .....5.35

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	....	....
Fostoria,O. S1	10.05	11.15	13.10	16.10	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.10	21.95	26.30
Buffalo W12	...	...	18.10	....	....
Fostoria,O. S1	...	...	18.30	22.15	....
FranklinPark,Ill. T6	...	...	18.45	22.30	26.65
Harrison,N.J. C18	...	...	18.10	21.95	26.30
NewYork W3	...	...	18.10	21.95	26.30
Palmer,Mass. W12	...	...	18.10	....	....
Trenton,N.J. R5	...	...	18.10	21.95	26.30
Worcester,Mass. A7, T6	...	...	18.10	21.95	26.30
Youngstown J5	...	...	18.45	22.30	26.65

SILICON STEEL

H.R.SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10.	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625*	10.85*	11.55*	12.65*	....
Mansfied,O. E6	9.625*	11.35	12.05	13.50	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10 (FP coils)	...	11.35	12.05	13.15	14.20

H.R. SHEETS (22Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	....
Butler,Pa. A10	....	....	....	19.20	19.70	20.20
Vandergrift,Pa. U5	.. 16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala.T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$7.85
Fairfield,Ala. T2 .....7.95
Fairless,Pa. U5 .....7.95
Fontana,Calif. K1 .....8.60
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 .....7.95
Ind.Harbor,Ind. I-2, Y1.7.85
Irvin,Pa. U5 .....7.85
Niles,O. R2 .....7.85
Pittsburg,Calif. C11 ....8.60
SparrowsPoint,Md. B2..7.95
Weirton,W.Va. W6 ....7.85
Yorkville,O. W10 .....7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....$7.50
Gary,Ind. U5 .....7.50
GraniteCity,Ill. G4 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Irvin,Pa. U5 .....7.50
Yorkville,O. W10 .....7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$9.70
Irvin,Pa. U5 .....9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5 .....$11.25

WIRE

WIRE, Manufacturing Bright, Low Carbon

AlabamaCity,Ala. R2 ..7.65
Aliquippa,Pa. J5 .....7.65
Alton,Ill. L1 .....7.85
Atlanta A11 .....7.85
Bartonville,Ill. K4 .....7.75
Buffalo W12 .....7.65
Chicago W13 .....7.65
Cleveland A7, C20 .....7.65
Crawfordsville,Ind. M8..7.75
Donora,Pa. A7 .....7.65
Duluth A7 .....7.65
Fairfield,Ala. T2 .....7.65
Fostoria,O.(24) S1 .....7.75
Houston S5 .....7.90
Jacksonville,Fla. M8 ...8.00
Johnstown,Pa. B2 .....7.65
Joliet,Ill. A7 .....7.65
KansasCity,Mo. S5 .....7.90
Kokomo,Ind. C16 .....7.75
LosAngeles B3 .....8.60
Minnequa,Colo. C10 .....7.90
Monessen,Pa. P7, P16 ..7.65
N.Tonawanda,N.Y. B11 7.65
Palmer,Mass. W12 .....7.95
Pittsburg,Calif. C11 ....8.60
Portsmouth,O. P12 ....7.65
Rankin,Pa. A7 .....7.65
S.Chicago,Ill. R2 .....7.65
S.SanFrancisco C10 ....8.60
SparrowsPoint,Md. B2 ..7.75
Sterling,Ill.(1) N15 ....7.65
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....7.65
Waukegan,Ill. A7 .....7.65
Worcester,Mass. A7 ....7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 ....12.65
Buffao W12 .....12.65
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 ....12.65
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P16 .....12.65
Muncie,Ind. I-7 .....12.85
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....12.95
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ...12.75
Struthers,O. Y1 .....12.65
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 ....9.55
LosAngeles B3 .....10.25
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16 ..9.30
New Haven,Conn. A7 ..9.60
Palmer,Mass. W12 ....9.60
Pittsburg,Calif. C11 ..10.25
Portsmouth,O. P12 ....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ....10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,Mass. A7 ....9.60

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Bartonville,Ill. K4 .....9.40
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Fostoria,O. S1 .....9.35
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 ....9.55
LosAngeles B3 .....10.25
Milbury,Mass.(12) N6 ..9.60
Minnequa,Colo. C10 ....9.55
Monessen,Pa. P7, P16..9.30
Muncie,Ind. I-7 .....9.50
Palmer,Mass.(12) W12 ..9.60
Pittsburg,Calif. C11 ...10.25
Portsmouth,O. P12 ....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ....10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,Mass. A7 ....9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....15.80
Bartonville,Ill. K4 ....15.70
Buffalo W12 .....15.60
Chicago W13 .....15.60
Cleveland A7 .....15.60
Crawfordsville,Ind. M8..15.70
Fostoria,O. S1 .....15.60
Houston S5 .....15.85
Jacksonville,Fla. M8 ..15.95
Johnstown,Pa. B2 .....15.60
KansasCity,Mo. S5 ....15.85
Kokomo,Ind. C16 .....15.60
Minnequa,Colo. C10 ....15.85
Monessen,Pa. P7, P16..15.60
Muncie,Ind. I-7 .....15.80
Palmer,Mass. W12 ....15.90
S.SanFrancisco C10 ....16.45
Waukegan,Ill. A7 .....15.60
Worcester,Mass. A7, T6 15.90

ROPE WIRE

Bartonville,Ill. K4 ....12.75
Buffalo W12 .....12.75
Fostoria,O. S1 .....12.75
Johnstown,Pa. B2 .....12.75
Monessen,Pa. P7 .....12.75
Muncie,Ind. I-7 .....12.95
Palmer,Mass. W12 ....13.05
Portmouth,O. P12 .....12.75
Roebling,N.J. R5 .....13.05
SparrowsPt.,Md. B2 ..12.85
Struthers,O. Y1 .....12.75
Worcester,Mass. J4 ....13.05
(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	16.55
Monessen,Pa. P16	16.55
Roebling,N.J. R5	17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	11.65
Baltimore T6	11.95
Boston T6	11.95
Buffalo W12	11.65
Chicago W13	11.75
Cleveland A7	11.65
Crawfordsville,Ind. M8	11.65
Dover,O. G6	11.65
Fostoria,O. S1	11.95
FranklinPark,Ill. T6	11.75
Kokomo,Ind. C16	11.65
Massillon,O. R8	11.65
Milwaukee C23	11.85
Monessen,Pa. P7, P16	11.65
Palmer,Mass. W12	11.95
Pawtucket,R.I. N8	11.95
Philadelphia P24	11.95
Riverdale,Ill. A1	11.75
Rome,N.Y. R6	11.65
Sharon,Pa. S3	11.65
Trenton,N.J. R5	11.95
Warren,O. B9	11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock	**Col.**
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Houston,Tex. S5	178
Fairfield,Ala. T2	173
Jacksonville,Fla.(20) M8	184
Joliet,Ill. A7	173
Johnstown,Pa. B2	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.95

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

POLISHED STAPLES	**Col.**
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) M8	186
Joliet,Ill. A7	175
Johnstown,Pa. B2	175
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	9.82
Chicago W13	10.26
Crawfordsville,Ind. M8	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. M8	10.82
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	10.36

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.15
Chicago W13	10.60
Crawfordsville,Ind. M8	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. M8	11.16
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	10.70

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.20
Chicago W13	10.65
Crawfordsville,Ind. M8	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. M8	11.21
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	10.75

BALE TIES, Single Loop	**Col.**
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
Sterling,Ill.(7) N15	214
SparrowsPt.,Md B2	214
Williamsport,Pa. S19	175

FENCE POSTS

Birmingham C15	171
ChicagoHts.,Ill. C2, I-2	172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	171
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	174

WIRE, Barbed	**Col.**
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston,Tex. S5	198**
Jacksonville,Fla. M8	203
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196*
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198§

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston,Tex. S5	192**
Jacksonville,Fla. M8	197
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192§

WIRE (16 gage)	**An'ld Galv. Stone**	**Galv. Stone**
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	17.15	18.95
Bartonville K4	17.25	19.05
Cleveland A7	17.15	....
Crawf'dsville M8	17.25	19.05
Fostoria,O. S1	17.65	19.20†
Houston S5	17.40	18.95**
Jacksonville M8	17.50	19.30
Johnstown B2	17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	17.25	18.80†
Minnequa C10	17.40	18.95**
P'lm'r,Mass. W12	17.45	19.00†
Pitts.,Calif. C11	17.50	19.05†
SparrowsPt. B2	17.25	19.05§
Sterling(37) N15	17.25	19.05§
Waukegan A7	17.15	18.70†
Worcester A7	17.45	....

WIRE, Merchant Quality (6 to 8 gage)	**An'ld Galv.**
Ala.City,Ala. R2	8.65 9.20**
Aliquippa J5	8.65 9.325§
Atlanta(48) A11	8.75 9.425*
Bartonville(48) K4	8.75 9.425
Buffalo W12	8.65 9.20†
Cleveland A7	8.65 ....
Crawfordsville M8	8.75 9.425
Donora,Pa. A7	8.65 9.20†
Duluth A7	8.65 9.20†
Fairfield T2	8.65 9.20†
Houston(48) S5	8.90 9.45**
Jacks'ville,Fla. M8	9.00 9.675
Johnstown B2(48)	8.65 9.325§
Joliet,Ill. A7	8.65 9.20†
Kans.City(48) S5	8.90 9.45**
Kokomo C16	8.75 9.30†
LosAngeles B3	9.60 10.275§
Minnequa C10	8.90 9.45**
Monessen P7(48)	8.65 9.25*
Palmer,Mass. W12	8.95 9.50†
Pitts.,Calif. C11	9.60 10.15†
Rankin,Pa. A7	8.65 9.20†
S.Chicago R2	8.65 9.20**
S.SanFran. C10	9.60 10.15**
Spar'wsPt.B2(48)	8.75 9.425§
Sterling(48) N15	8.90 9.575§
Sterling(1)(48)	8.80 9.475§
Struth'rs,O.(48)Y1	8.65 9.30‡
Worcester,Mass.A7	8.95 9.50†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)	
½ in. and smaller:	
6 in. and shorter	49.0
Longer than 6 in.	39.0
⅝ in. thru 1 in.:	
6 in. and shorter	39.0
Longer than 6 in.	35.0
1⅛ in. and larger:	
All lengths	35.0
Undersized Body (rolled thread)	
½ in. and smaller:	
6 in. and shorter	49.0

Carriage, Machine, Lag Bolts

Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	29.0
Longer than 6 in.	15.0
⅝ in. and larger:	
All lengths	12.0

Lag Bolts (all diam.)

6 in. and shorter	49.0
Longer than 6 in.	39.0

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	49.0
Larger than ½ in. or longer than 6 in.	39.0

Blank Bolts 39.0

Step, Elevator, Tire Bolts 49.0

Stove Bolts, Slotted:

⅛ to ¼-in. incl.-	
3 in. and shorter	55.0
⅛ to ½ in., inclusive	55.0

NUTS

Reg. & Heavy Square Nuts:

All sizes	55.5

Square Nuts, Reg. &

Heavy, Hot Galvanized:

All sizes	41.0

Hex Nuts, Reg. &

Heavy, Hot Pressed:

¾ in. and smaller	60.5
⅞ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger	53.5

Hex Nuts, Reg. &

Heavy, Cold Punched:

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller	46.5
⅞ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	60.5
¾ in. to 1 in., incl	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	40.0
¾, ⅞ and 1 in. diam.	22.0
Longer than 6 in.:	
⅝ in. and smaller	8.0
¾, ⅞ and 1 in. diam.	+6.0

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	26.0
¾, ⅞ and 1 in. diam.	3.0
Longer than 6 in.:	
⅝ in. and smaller	+13.0
¾, ⅞ and 1 in. diam.	+32.0

Flat Head Capscrews:

¾ in. and smaller	+76.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam:	
6 in. and shorter	Net
Longer than 6 in.	+23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.25
7/8 in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2¼	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All Under 60 lb
RAILS			
Bessemer,Pa. U5	5.525	5.425	6.50
Ensley,Ala. T2	5.525	5.425	6.50
Fairfield,Ala. T2	....	....	6.50
Huntington,W.Va. C15	....	....	6.50
Gary,Ind. U5	5.525	5.425	....
IndianaHarbor,Ind. I-2	5.525	5.425	5.475
Johnstown,Pa. B2	....	....	(16)6.50
Lackawanna,N.Y. B2	5.525	5.425	6.50
Minnequa,Colo. C10	5.525	5.425	7.00
Steelton,Pa. B2	5.525	5.425	....
Williamsport,Pa. S19	....	....	6.50

TIE PLATES	
Fairfield,Ala. T2	6.60
Gary,Ind. U5	6.60
Ind.Harbor,Ind. I-2	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Seattle B3	6.75
Steelton,Pa. B2	6.60
Torrance,Calif. C11	6.75

JOINT BARS	
Bessemer,Pa. U5	6.975
Fairfield,Ala. T2	6.975
Ind.Harbor,Ind. I-2	6.975
Joliet,Ill. U5	6.975
Lackawanna,N.Y. B2	6.975
Minnequa,Colo. C10	6.975
Steelton,Pa. B2	6.975

AXLES	
Ind.Harbor,Ind. S13	8.775
Johnstown,Pa. B2	8.775

TRACK BOLTS, Untreated	
Cleveland R2	14.75
KansasCity,Mo. S5	14.75
Lebanon,Pa. B2	14.75
Minnequa,Colo. C10	14.75
Pittsburgh P14	14.75
Seattle B3	15.25

SCREW SPIKES	
Lebanon,Pa. B2	14.50

STANDARD TRACK SPIKES	
Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	9.75
Lebanon,Pa. B2	9.75
Minnequa,Colo. C10	9.75
Pittsburgh J5	9.75
Seattle B3	10.25
S.Chicago,Ill. R2	9.75
Struthers,O. Y1	9.75
Youngstown R2	9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 13 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 1000 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 6.045c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(46) Special quality.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 8.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	118.75	....	132.00	138.50	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.43-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.755
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

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In a bearing, PLANNED PRECISION is the carefully evaluated incorporation of whatever precision features are necessary to provide for the functional requirements of the job—not more, not less. Precision refinements are costly, and should be selected with care to insure products that are both economically and functionally correct.

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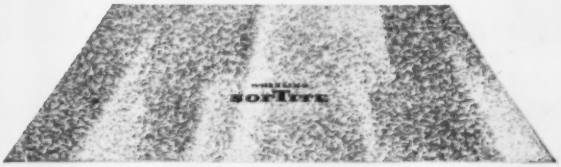
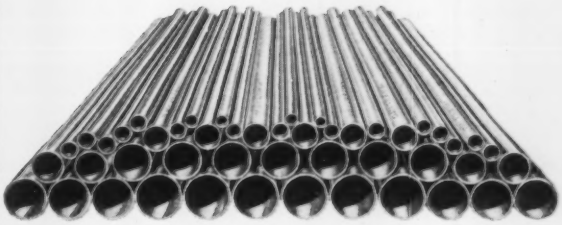


and speed your building...



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He has Wheeling soFTite Galvanized Sheets, for example. This is the sheet acknowledged to be the tightest-coated galvanized sheet yet produced. It's so tight-coated you can use it to make anything that can be made of steel sheets.

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District Sales Offices
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Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	....	66.50	....
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.62	69.12	69.12	69.62
Muskegon,Mich., deld	....	74.12	74.12	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,O., deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.10	75.60	....
Newark,N.J., deld.	72.29	72.79	73.29	73.79
Philadelphia, deld.	70.01	70.51	71.01	71.59
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard, O. Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,O., deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	66.50	67.00	67.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,O. I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	78.00
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.27
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

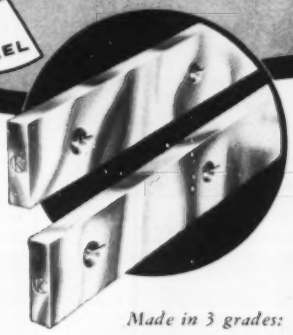
	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13§	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.76	....	8.76	9.06	11.34 #	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	10.15	....	8.23	8.60	10.57	....	8.64	8.58	10.70
Boston	9.38	10.44	11.45	....	9.42	9.73	....	15.28	9.63	9.72	11.20
Buffalo	8.25	9.45	11.07	....	8.50	8.80	....	15.00	8.90	8.90	10.45
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	8.20	9.45	10.00	....	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	....	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	....	8.33	8.69	....	14.74	9.01	8.79	10.11
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.35	....	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.45	9.75	8.45	....	8.60	9.05	11.10	....	9.10	9.05	10.30
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.50	10.75	11.65	....	9.55	9.70	12.75	16.00	9.60	9.55	11.70
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	....	9.31	9.57	....	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	51.94	8.67	8.65	11.51 # †††	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.35	50.00	8.33	8.60	....	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.20	11.35‡‡	8.65	14.65 #	15.95	9.60	8.30	12.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.36	9.66	....	9.44	9.30	10.49
San Francisco	9.35	10.75	11.00	54.85	9.45	9.70	13.00	16.00	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.20	10.00	10.10	14.05	16.35	9.80	9.70	12.10
Spokane, Wash.	9.95	11.15	12.00	....	10.00	10.10	14.05	17.10	9.80	9.70	12.10
Washington	8.48	9.58	....	....	9.06	9.15	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras, except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018; †††item quantity.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [2]—400 to 9999 lb; [5]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

"CLEVELAND"
SQUARING SHEAR BLADES

SOLID TOOL STEEL



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Made in 3 grades:

"Peerless" (high carbon high chrome)

"Century" (high alloy)

"Standard" (low alloy)

Used by EVERY manufacturer of squaring shears as original equipment. Because they are ground to the closest tolerances in the knife industry — "CLEVELAND" shear blades insure maximum cutting life . . .

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Cable Conveyor Components

Mechanized treating and finishing in just 27 ft. by 5 ft. of floor space —another space saving application of a versatile Bush-Lock Cable Conveyor, the low-cost package of standard stock components.

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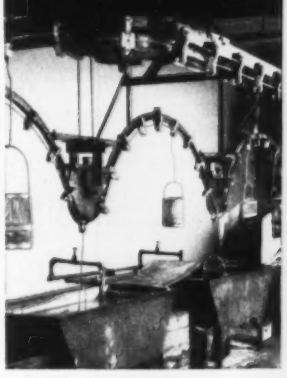

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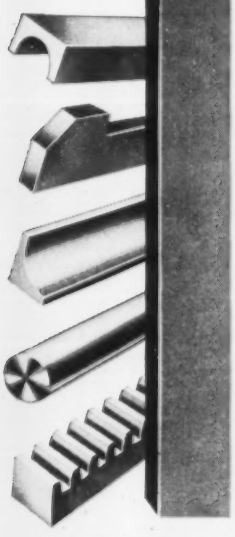
- fast shipments direct from plant
- district warehouse distributors

Moltrup

COLD DRAWN Steel



Cut costs by ordering exact shapes needed — drawn to the exceptionally close tolerances that have made MOLTRUP the quality name in steel for over 65 years. All standard shapes — any special shape . . . carbon — alloy — leaded steels . . . close-tolerance key stock.

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BEAVER FALLS, PA.

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Detroit, Mich. New York, N. Y. Syracuse, N. Y. Cincinnati, O.
Cleveland, O. Los Angeles, Calif.

51

Refractories

Fire Clay Brick (per 100)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haideman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Silica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96.75; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, O., $16.75; Thornton, McCook, Ill. $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry duty paid, metallurgical grade: European, $33-34; Mexican, all-rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi river, ocean bags 23,000 lb and over..	10.50
F.o.b. Riverton or Camden, N. J., west of Mississippi River.	9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
F.o.b. Riverton, N.J., west of Mississippi River	9.50
Sponge Iron, Canadian: F.o.b. shipping point	9.50
Electrolytic Iron: .... Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	

Aluminum: Atomized, 500 lb drum, frght allowed	
Carlots	39.50
Ton lots	41.50
Antimony, 500 ton lots	32.00*
Brass, 5000-lb lots .....32.00-39.70†	
Bronze, 5000-lb lots .....49.50-54.10†	
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh ...	70.00
Minus 200 mesh ...	75.00
Nickel, unannealed ...	$1.15
Nickel-Silver, 5000-lb lots .....50.20-54.80†	
Phosphor-Copper, 5000-lb lots	61.30
Copper (atomized) 5000-lb lots .....41.80-50.30‡	
Silicon	47.50
Solder	7.00*
Stainless Steel, 304 ....$1.02	
Stainless Steel, 316 ....$1.20	
Tin 14.50*	
Zinc, 5000-lb lots 17.50-30.70‡	
Tungsten: Melting grade, 99% 60 to 2000 mesh:	Dollars
1000 lb and over ...	3.75
Less than 1000 lb ..	3.90
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

—Inches— Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5½	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305..	$6.30	$6.25	$6.25	$6.50
Bar Size Angles	6.62	6.57	6.57	6.75
Structural Angles	6.62	6.57	6.57	6.75
I-Beams	6.87	6.82	6.82	7.00
Channels	6.87	6.82	6.82	7.00
Plates (basic bessemer)	8.35	8.30	8.30	8.60
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.87	6.82	6.82	7.22
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, U.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (‡)	8.38	8.38	8.38	8.58

†Per 82 lb, net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic concentrates	62-64% 25.00-27.90

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	30.00

Tungsten Ore

Net ton, unit, before duty

Foreign wolframite, good commercial quality	13.75-14.25
Domestic, concentrates mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.35-$1.45 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, $1.35-$1.45; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$55.00-58.00
48% 2.8:1	52.00-55.00
48% no ratio	46.00-48.00

South African Transvaal

48% no ratio	$40.00-41.00
44% no ratio	30.00-31.00

Turkish

48% 3:1	$59.00-62.00

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.90-3.30
60-65%	3.30-3.60

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens.	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Ore within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

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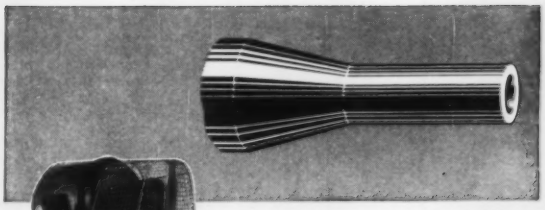

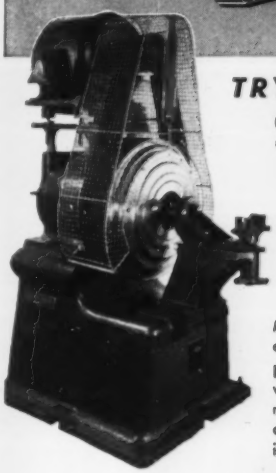

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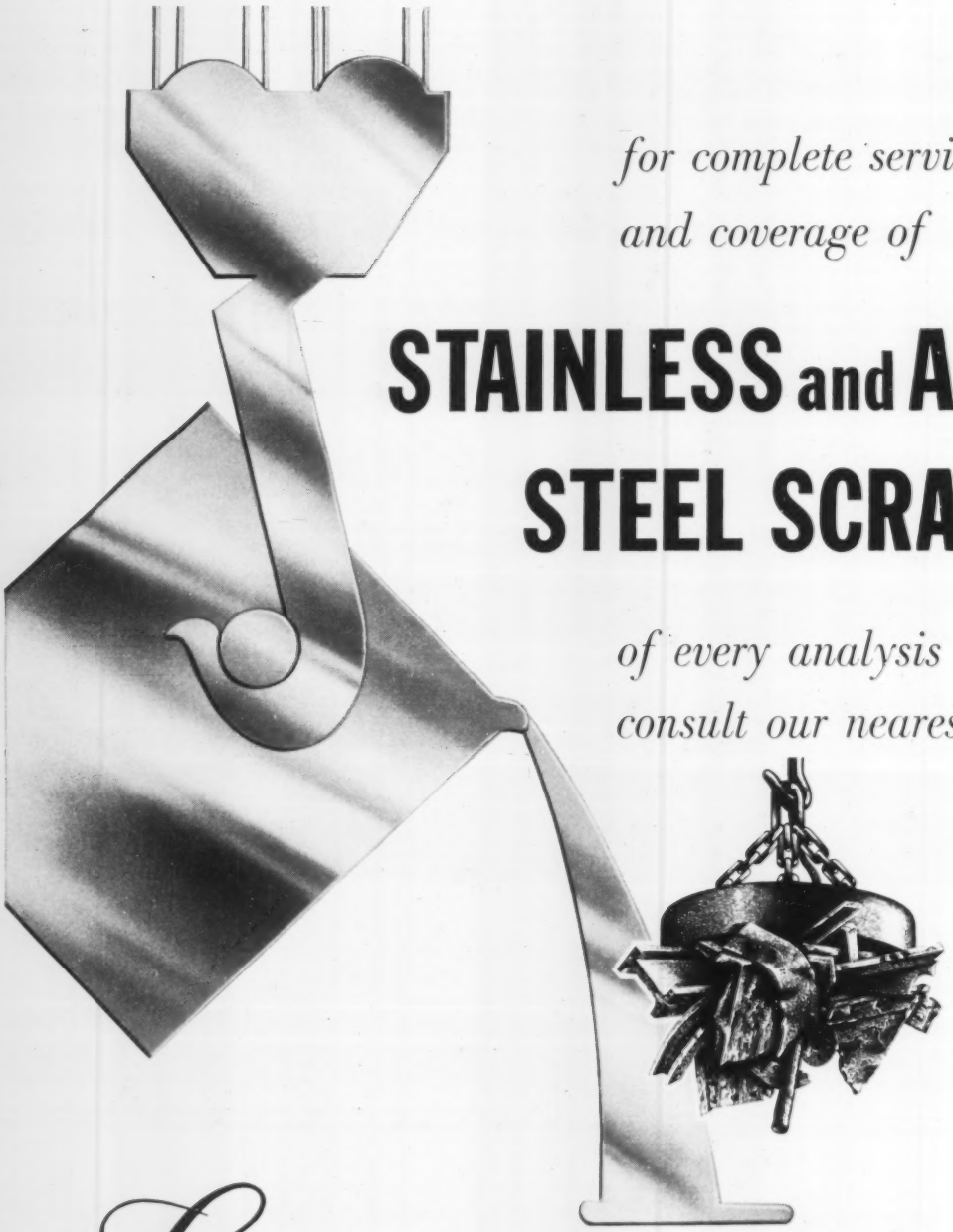

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Scrap Prices Further Depressed

Consumers still showing little interest in tonnage, and market undertone is soft. STEEL's composite on the prime grade falls $1.66 to $50.17, lowest since May

Scrap Prices, Page 214

Philadelphia — Domestic steel scrap prices continue to decline due to slack demand. No. 1 heavy melting is holding at $48, delivered, No. 2 heavy melting at $44, No. 1 bundles at $50, No. 2 bundles at $39, and No. 1 busheling at $50.

Pittsburgh—An area mill purchased No. 1 heavy melting scrap for $52, No. 2 heavy melting for $44 and No. 2 bundles for $41 last week. The prices represented declines of $2 to $3 from those of the previous week. Demand continues dull. Price of No. 1 railroad heavy melting dropped $4 a ton, to $57. Users of cut structurals say the market is softer, with prices off about $1 the past week.

Cincinnati—No. 1 heavy melting is off $1 a ton to $48-$49, broker's buying price, in a slow market. Mills have placed September orders, but tonnages are small.

Cleveland — The scrap market here is slow. Material is moving on old contracts, but there is practically no new buying. Prices are tending downward. They are off about $2 from week-ago figures, with the list nominal in the absence of representative sales.

New York — Brokers reduced their buying prices on most grades of steel scrap. They are offering $47-$48 for No. 1 heavy melting and No. 1 bundles, $38-$39 for No. 2 heavy melting, $35-$36 for No. 2 bundles, $19-$20 for machine shop turnings, $21-$22 for mixed borings and turnings, $22-$23 for short shoveling turnings, and $50-$51 for low phos structurals and plates.

Nickel bearing grades of stainless scrap continue to slip.

Chicago—A high degree of stability is noted in the scrap market here. The few price adjustments made though have been downward $1 to $2 a ton. Blast furnace grades and a few railroad items are involved.

Buffalo — Principal grades of steel scrap are off $2 a ton on new sales here. No. 1 heavy melting sold at $48, No. 2 heavy melting at $41.50, and No. 2 bundles at $38.50. All are down $2 a ton from prices paid last month.

Blast furnace material also is off around $2, along with low phos, now quoted at $53-54.

Detroit—The local scrap market is steady with minor buys reported. There isn't enough activity to develop a definite market trend, but indications are prices may move upward slightly at the end of this month.

Birmingham—The scrap market is weak. Declines are reported on many items. Brokers attribute these to the drying up of export demand and heavier dealer offerings to interior mills.

Los Angeles—A slightly softer scrap market is noted here. Prices are holding though and dealers think present levels will be maintained through most of September.

Seattle—Increasing weakness in the eastern markets has not affected the local market. Prices are unchanged, holding at the lower levels established several weeks ago. Dealers say No. 1 is steady at $2 and No. 2 at $40.

San Francisco—Prime grades of steel scrap are quoted off $3 a ton. The decline is attributed to slow export demand and curtailed operations at domestic steel mills.

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BRIKLOK is a super duty, air-setting, fireclay base mortar which sets hard and develops high strength merely upon drying. It is widely used for laying, coating and patching fireclay and silica brickwork. BRIKLOK has good resistance to slag and abrasion and withstands temperatures up to 3056°F. BRIKLOK A is a wet mixture while BRIKLOK is furnished as a dry powder.

GREFCO SILLIMANITE is a highly refractory mortar with a base material consisting mainly of mullite crystals. This insures very high refractoriness and freedom from shrinkage at high temperatures. This high quality mortar is recommended for laying up and coating fireclay, high alumina or SILLIMANITE brick, and should always be used wherever a mortar is required for the latter.

SILLIMANITE 343 is a wet air-setting mixture. SILLIMANITE 340 is a dry heat-setting mixture. Consult your Grefco representative as to which of the several varieties best suits your needs.

GENERAL REFRACTORIES COMPANY
Philadelphia 2, Pa.

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Sept. 11, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Sept. 11	$50.17
Sept. 4	51.83
Aug. Avg	53.33
Sept. 1956	59.08
Sept. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 factory bundles	*59.00-60.00*
No. 1 dealer bundles	*51.00-52.00*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*51.00-52.00*
Machine shop turnings	*30.00-31.00*
Mixed borings, turnings	*30.00-31.00*
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals:	
2 ft and under	*60.00-61.00*
3 ft lengths	*59.00-60.00*
Heavy turnings	47.00-48.00
Punchings & plate scrap	*59.00-60.00*
Electric furnace bundles	*59.00-60.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
Clean auto cast	49.00-50.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	*56.00-57.00*
Rails, 2 ft and under	*71.00-72.00*
Rails, 18 in. and under	*72.00-73.00*
Angles, splice bars	61.00-62.00
Rails, rerolling	67.00-68.00

Stainless Steel Scrap

18-8 bundles & solids	240.00-250.00
18-8 turnings	140.00-150.00
430 bundles & solids	80.00-85.00
430 turnings	55.00-60.00

CLEVELAND

No. 1 heavy melting	*49.00-50.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 factory bundles	*54.00-55.00*
No. 1 bundles	*49.00-50.00*
No. 2 bundles	*39.00-40.00*
No. 1 busheling	*49.00-50.00*
Machine shop turnings	*21.00-22.00*
Short shovel turnings	*25.00-26.00*
Mixed borings, turnings	*25.00-26.00*
Cast iron borings	*25.00-26.00*
Cut foundry steel	*49.00-50.00*
Cut structurals, plates 2 ft and under	*56.00-57.00*
Low phos. punchings & plate	*50.00-51.00*
Alloy free, short shovel turnings	*28.00-29.00*
Electric furnace bundles	*50.00-51.00*

Cast Iron Grades

No. 1 cupola	*49.00-50.00*
Charging box cast	*39.00-40.00*
Heavy breakable cast	*37.00-38.00*
Stove plate	*46.00-47.00*
Unstripped motor blocks	*33.00-34.00*
Brake shoes	*37.00-38.00*
Clean auto cast	*50.00-51.00*
Burnt cast	*35.00-36.00*
Drop broken machinery	*52.00-53.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*51.00-52.00*
R.R. malleable	59.00-60.00
Rails, 2 ft and under	*71.00-72.00*
Rails, 18 in. and under	*72.00-73.00*
Rails, random lengths	*64.00-65.00*
Cast steel	*62.00-63.00*
Railroad specialties	*64.00-65.00*
Uncut tires	*59.00-60.00*
Angles, splice bars	*64.00-65.00*
Rails, rerolling	*69.00-70.00*

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	230.00-240.00
18-8 turnings	130.00-140.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*52.00-53.00*
No. 2 heavy melting	*44.00-45.00*
No. 1 bundles	*52.00-53.00*
No. 2 bundles	*41.00-42.00*
No. 1 busheling	*52.00-53.00*
Machine shop turnings	*21.00-22.00*
Short shovel turnings	*27.00-28.00*
Cast iron borings	*27.00-28.00*
Low phos.	*54.00-55.00*
Electric furnace bundles	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*54.00-55.00*

CHICAGO

No. 1 heavy melt., indus.	52.00-53.00
No. 1 hvy melt., dealer	49.00-50.00
No. 2 heavy melting	41.00-42.00
No. 1 factory bundles	55.00-56.00
No. 1 dealer bundles	50.00-51.00
No. 2 bundles	39.00-40.00
No. 1 busheling, indus.	52.00-53.00
No. 1 busheling, dealer	49.00-50.00
Machine shop turings	*30.00-31.00*
Mixed borings, turnings	*32.00-33.00*
Short shovel turnings	*32.00-33.00*
Cast iron borings	*32.00-33.00*
Cut structurals, 3 ft.	54.00-55.00
Punchings & plate scrap	55.00-56.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	42.00-43.00
Unstripped motor blocks	*34.00-35.00*
Clean auto cast	49.00-50.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	54.00-55.00
R.R. malleable	58.00-59.00
Rails, 2 ft and under	66.00-67.00
Rails, 18 in. and under	67.00-68.00
Angles, splice bars	61.00-62.00
Axles	*67.00-68.00*
Rails, rerolling	*65.00-66.00*

Stainless Steel Scrap

18-8 bundles & solids	*225.00-235.00*
18-8 turnings	*125.00-135.00*
430 bundles & solids	*90.00-100.00*
430 turnings	*60.00-70.00*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	39.00-41.00
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*35.50-36.50*
No. 1 busheling	45.00-46.00
Machine shop turnings	25.00-26.00
Mixed borings, turnings	26.00-27.00
Short shovel turnings	27.00-28.00
Punchings & plate scrap	53.00-54.00

Cast Iron Grades

No. 1 cupola	*49.00*
Charging box cast	44.00
Stove plate	44.00
Heavy breakable	43.00
Unstripped motor blocks	34.00
Clean auto cast	*51.00*
Malleable	55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	47.00
No. 2 heavy melting	*45.00*
No. 1 bundles	47.00
No. 2 bundles	39.00
No. 1 busheling	47.00
Machine shop turnings	*28.00*
Short shovel turnings	*32.00*

Cast Iron Grades

No. 1 cupola	*47.00*
Charging box cast	43.00
Heavy breakable cast	43.00
Unstripped motor blocks	43.00
Brake shoes	40.00
Clean auto cast	48.00
Stove plate	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	*54.00*
Rails, 18 in. and under	*70.00*
Rails, random lengths	*63.00*
Rails, rerolling	71.00
Angles, splice bars	59.00

PHILADELPHIA

No. 1 heavy melting	*48.00*
No. 2 heavy melting	*44.00*
No. 1 bundles	*50.00*
No. 2 bundles	*39.00*
No. 1 busheling	*50.00*
Electric furnace bundles	*52.00-53.00*
Mixed borings, turnings	*34.00*
Short shovel turnings	*35.00*
Machine shop turnings	*32.00*
Heavy turnings	*43.00-44.00*
Structural & plate	*54.00-55.00*
Couplers, spring, wheels	66.00
Rail crops, 2 ft & under	69.00-71.00

Cast Iron Grades

No. 1 cupola	47.00
Heavy breakable cast	53.00
Malleable	62.00
Drop broken machinery	56.00-57.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*47.00-48.00*
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	*47.00-48.00*
No. 2 bundles	*35.00-36.00*
Machine shop turnings	*19.00-20.00*
Mixed borings, turnings	*21.00-22.00*
Short shovel turnings	*22.00-23.00*
Low phos. (structural & plate	*50.00-51.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	39.00-40.00
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips, solids	*200.00-210.00*
18-8 borings, turnings	*100.00-105.00*
430 sheets, clips, solids	65.00-75.00
410 sheets, clips, solids	50.00-55.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*33.00-34.00*
No. 1 bundles	*38.00-39.00*
No. 2 bundles	*31.00-32.00*
No. 1 busheling	*38.00-39.00*
Machine shop turnings	*18.00-18.50*
Mixed borings, turnings	*19.00-19.50*
Short shovel turnings	*20.00-21.00*
No. 1 cast	*33.00-34.00*
Mixed cupola cast	*32.00-33.00*
No. 1 machinery cast	*41.00-42.00*

BUFFALO

No. 1 heavy melting	*47.00-48.00*
No. 2 heavy melting	*40.50-41.50*
No. 1 bundles	*47.00-48.00*
No. 2 bundles	*37.50-38.50*
No. 1 busheling	*47.00-48.00*
Mixed borings, turnings	*31.00-32.00*
Machine shop turnings	*29.00-30.00*
Short shovel turnings	*32.00-33.00*
Cast iron borings	33.00-34.00
Low phos.	*53.00-54.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	48.00-49.00
No. 1 machinery	53.00-54.00

Railroad Scrap

Rails, random lengths	61.00-62.00
Rails, 3 ft and under	66.00-67.00
Railroad specialties	59.00-60.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*48.00-49.00*
No. 2 heavy melting	43.00-44.00
No. 1 bundles	49.00-50.00
No. 2 bundles	38.00-39.00
No. 1 busheling	49.00-50.00
Machine shop turnings	30.00-31.00
Mixed borings, turnings	26.00-27.00
Short shovel turnings	33.00-34.00
Cast iron borings	26.00-27.00
Low phos. 18 in.	56.00-57.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	41.00-42.00
Charging box cast	41.00-42.00
Drop broken machinery	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt.	53.00-54.00
Rails, 18 in. and under	71.00-72.00
Rails, random lengths	64.00-65.00

BIRMINGHAM

No. 1 heavy melting	*46.00-47.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 bundles	*46.00-47.00*
No. 2 bundles	32.00-33.00
No. 1 busheling	*46.00-47.00*
Cast iron borings	27.00-28.00
Short shovel turnings	*37.00-38.00*
Machine shop turnings	*36.00-37.00*
Bar crops and plates	*54.00-55.00*
Structurals & plate	*53.00-54.00*
Electric furnace bundles	48.00-49.00
Electric furnace:	
3 ft and under	46.00-47.00
2 ft and under	*47.00-48.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	54.00-55.00
Stove plate	54.00-55.00
Unstripped motor blocks	44.00-45.00
Charging box cast	37.00-38.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	52.00-53.00
Rails, 18 in. and under	*63.00-64.00*
Rails, rerolling	*62.00-63.00*
Rails, random lengths	*57.00-58.00*
Angles, splice bars	*58.00-59.00*

SEATTLE

No. 1 heavy melting	42.00
No. 2 heavy melting	40.00
No. 1 bundles	40.00
No. 2 bundles	29.00
Machine shop turnings	27.00
Mixed borings, turnings	27.00
Electric furnace No. 1	48.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	35.00
Unstripped motor blocks	30.50
Stove plate (f.o.b. plant)	28.00

LOS ANGELES

No. 1 heavy melting	50.00
No. 2 heavy melting	48.00
No. 1 bundles	49.00
No. 2 bundles	38.00
Machine shop turnings	36.00
Shoveling turnings	36.00
Cast iron borings	32.00
Cut structural and plate, 1 ft and under	61.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	55.00

Railroad Scrap

No. 1 R.R. heavy melt.	50.00

SAN FRANCISCO

No. 1 heavy melting	*44.00*
No. 2 heavy melting	*42.00*
No. 1 bundles	*43.00*
No. 2 bundles	*32.00*
Machine shop turnings	*30.00*
Mixed borings, turnings	*30.00*
Cast iron borings	*30.00*
Heavy turnings	*30.00*
Short shovel turnings	*30.00*
Cut structurals, 3 ft.	*53.00*

Cast Iron Grades

No. 1 cupola	53.00-54.00
Charging box cast	45.00-47.00
Stove plate	46.00
Heavy breakable cast	40.00
Unstripped motor blocks	43.00
Clean auto cast	55.00
No. 1 wheels	48.00
Drop broken machinery	53.00

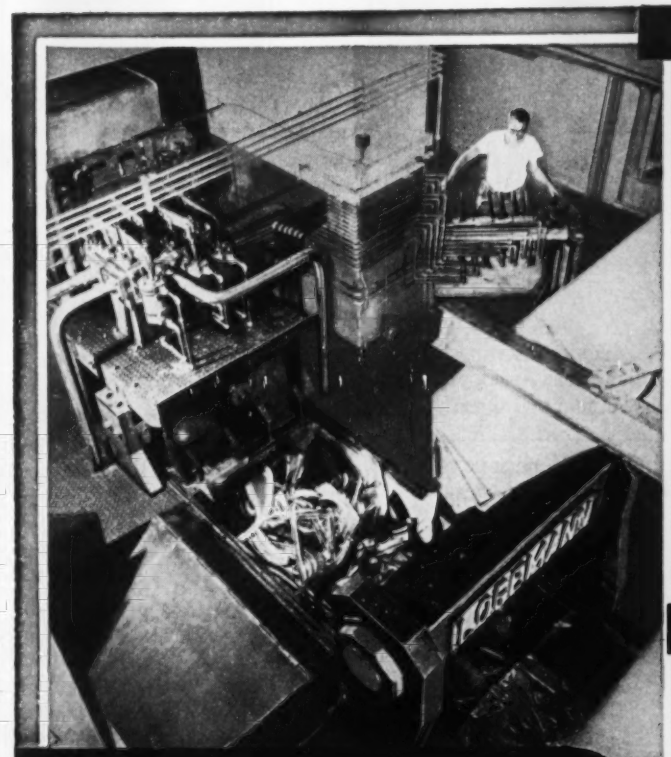
HAMILTON, ONT.

No. 1 heavy melting	50.00
No. 2 heavy melting	45.00
No. 1 bundles	50.00
No. 2 bundles	39.00
Mixed steel scrap	47.00
Mixed borings, turnings	24.00
Busheling, new factory:	
Prepared	50.00
Unprepared	44.00
Short steel turnings	30.00
Rails, rerolling	61.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.



LOGEMANN Metal Balers

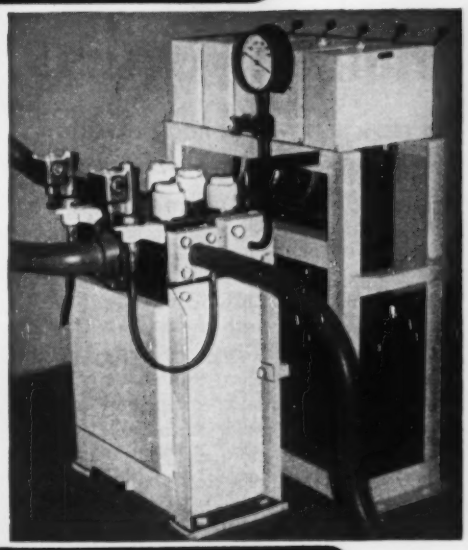
. . . powerful . . . compact . . . capable of high tonnage output!

In the large stamping plants and rolling mills where it is critically important that trim and stamping skeletons are quickly disposed of to avoid interference with production, LOGEMANN metal balers are relied on to keep ahead of production and pack such scrap into high density, self-cohering bricks for re-melting.

Hundreds of installations have established new records for tonnage, minimum maintenance, reliability, over extended periods of uninterrupted operation at high-speed.

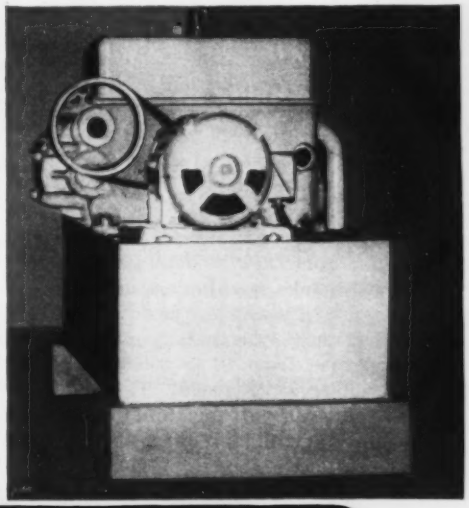
LOGEMANN models are not confined to the large sizes. Many small plants have found it profitable to use smaller sizes embodying the same features of reliability, at minimum operating cost. Interested parties are invited to write for details. Information as to the character of the scrap, tonnage to be handled in a given period of hours, and range of gauges is helpful in determining the proper model.

LOGEMANN



HYDRAULIC VALVES

The illustration shows a close-coupled hydraulic valve, operated by compressed-air cylinders for high-speed distribution of large gallonage of fluid at high pressure. LOGEMANN engineers have designed and built valves for many unusual as well as standard applications, and will welcome inquiries, with an outline of the conditions and requirements.



HYDRAULIC PUMPS

The opposed-cylinder close-coupled double pressure pump shown in the illustration is mounted on an individual tank to conserve floor space under present crowded plant and operating conditions. When requesting details, please indicate the nature of the service, pressure and gallonage requirements, and the fluid to be handled.

LOGEMANN BROTHERS CO.

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Titanium Orders Lag

Business is down although a strong first half will make 1957 the industry's best year. Another cut in the primary copper price is likely as custom smelter and foreign prices drop

Nonferrous Metal Prices, Pages 218 & 219

TITANIUM SHIPMENTS are headed for a record year (see chart), but there's little rejoicing in the industry. Reason: Shipments are running 25 per cent lower than they were in the first half and will probably fall even more in 1958.

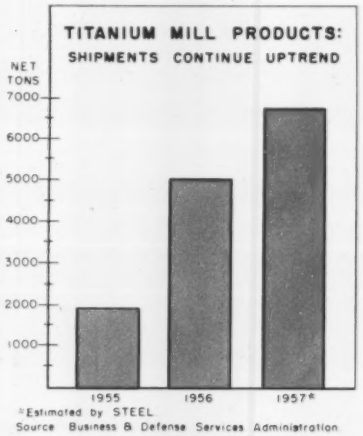
The year started off with a bang; 3828 tons of mill products were shipped in the first six months—the figure should reach around 6800 tons by yearend. The total in 1956 was 5000 tons.

Down—But business has lost its snap since midyear. The reason: Uncle Sam has canceled or stretched out virtually every military aircraft order (about 95 per cent of titanium production goes into military aircraft). Some examples: B-52 production was cut by 25 per cent; production of F-101, F-104, and F-106 fighters was curtailed; the Navaho missile, slated to take substantial amounts of titanium, was scratched.

Producers, viewing the trend away from manned aircraft and aware that some new models, such as the B-58, take no titanium, are casting an appraising eye at missiles. They point out that 38 missiles, weighing from 18 to 200,000 lb, are under development. Estimates of this market for titanium range from the highly optimistic to the cautious. (Some titanium now goes into missile nose cones and other components.) One industry spokesman predicts titanium will be tomorrow's missile airframe material. Another says missiles will never take the tonnage the aircraft industry did.

Future—It's generally agreed titanium's long-range future is tied to civilian applications. So far, two factors have prevented any great entry into this market: 1. Relatively high cost. 2. Insufficient production.

The price has steadily come down—it's now $2.25 a pound for Grade A-1 ductile sponge, about one-half of the 1954 quotation. Although no producer has announced plans for further price revisions, some believe the industry will see another slash by yearend.



Actually, producers say, the major hitch to crashing the civilian market has been availability rather than price. One producer compares titanium's status to that of aluminum several years ago—he believes the increased production and shrinking military demand will be healthy for the industry in the long run because they will encourage civilian uses.

Several new applications may hold the key to the metal's future. Example: Titanium Metals Corp. of America, New York, reports what is said to be the largest industrial order for fabricated titanium in the history of the industry—7 miles of seamless pressure tubing. To be extruded in 2130 sections, each 17.5 ft long, it will be used in eight kettle-type heat exchangers employed in processing nickel and cobalt ore. (For a complete rundown on titanium, watch for the Sept. 23 issue of STEEL.)

Copper: More Price Cuts?

There's no end in sight to the downward spiral of copper prices. The betting is that primary will see another price slash soon, probably to the 25.5 or 26 cent a pound level. (It's now quoted at 27 cents.)

Recent dips in both custom smelted and primary grades have had no effect on demand. In fact, the market is weaker than before. Some examples: 1. Custom smelters cut their quotation an additional 1.5 cents on Sept. 9 to the 25 cent a pound level. Observers say they are doubtful the price can hold. One custom smelter reports a mild pickup in business, but admits it is not strong enough to sustain the current price. 2. Sinking foreign prices are having their usual depressing effect on the American market. On Sept. 11 the bid price on the London Metal Exchange was down to 22.87 cents—on the same day the Rhodesian Selection Trust was quoting 23.75 cents. A combination of these factors will pull down the primary

NONFERROUS PRICE RECORD

	Price Sept. 11	Last Change	Previous Price	Aug. Avg	July Avg	Sept., 1956 Avg
Aluminum ..	28.10	Aug. 1, 1957	27.10	28.100	27.100	27.100
Copper	25.00-27.00	Sept. 9, 1957	26.50-27.00	28.639	28.822	39.500
Lead	13.80	June 11, 1957	14.80	13.800	13.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	93.25	Sept. 5, 1957	93.00	94.259	96.576	103.745
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

price again before too long, metalsmen say.

Industry spokesmen are more positive than ever that a sharp production curtailment will have to take place soon. A possible forerunner of a cutback wave was the announcement by Calumet & Hecla Inc.: It is considering a complete closedown of operations at its copper mining division in Calumet, Mich., because of the decline in prices. Another factor, an explosion at Anaconda Co.'s Chuquicamata mine in Chile, has stopped production at the 20,000 ton a month facility.

Observers say there's nothing wrong with the copper market that production cuts won't cure. One metalsman predicts that as soon as the price stabilizes orders will rise.

Several industry spokesmen have called recently for governmental action to end the wave of imports, another of copper's problems. One plan calls for the government to reimpose the 2 cent a pound levy on foreign ore when the domestic price falls to 27 cents (the present peril point is 24 cents a pound); another plan suggests a 6 cent a pound import tax when the price level drops below 32 cents.

Aluminum Sales Steady

Producers report business is fair, although the expected fall upturn hasn't materialized. Industry sources say developments in the next month should point up just how good sales will be the rest of the year.

Aluminum sheet and plate shipments hit 59,613 tons in July, compared with 52,964 tons in June, reports the Aluminum Association. Shipments for the first seven months totaled 392,239 tons. This year's shipment of aluminum foil stands at 50,236 tons.

Mag Ingot Output Up

Primary production of magnesium in July was 6598 tons, reports the Magnesium Association. It compares with 6534 tons in June and 1136 tons in July of 1956. Shipments of wrought products were down—714 tons in July, compared with 941 tons in June and 1001 tons in July, 1956.

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Unnoticed by most . . . taken for granted by those who live by its warnings, the searchlight signal of cTc — Centralized Traffic Control — stands guard on railways stretching from coast to coast. In bustling terminals . . . at lonely prairie crossroads, Seymour "PHOSPHOR BRONZE" helps these unfailing sentinels flash the stop and go messages which control our rail-borne commerce. Contact springs, connectors and other parts of their electric nerve system are formed from this corrosion-resistant, even-tempered, long-lived and reliable metal.

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THE SEYMOUR MFG. CO.

3 FRANKLIN STREET, SEYMOUR, CONNECTICUT

*Registered Trade Mark of the General Railway Signal Company

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.
Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100-lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $120 per lb, nom.

Copper: Electrolytic, 27.00 deld.; custom smelters, 25.00; lake, 27.00 deld.; fire refined, 26.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $86-110 nom. per troy oz.

Lead: Common, 13.80; chemical, 13.90; corroding, 13.90, St. Louis, New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $250-252 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz, nom.

Palladium: $21-24 per troy oz.

Platinum: $81-87 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $10.50 per lb, commercial grade.
Silver: Open market, 90.625 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55, per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 93.25; prompt, 93.00.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.50 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.10-4.20.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-30.25; No. 12 foundry alloy (No. 2 grade), 22.25-23.00; 5% silicon alloy, 0.60 Cu max., 25.50-26.00; 13 alloy, 0.60 Cu max., 25.50-26.00; 195 alloy, 25.25-26.75; 108 alloy, 22.75-23.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.00; grade 2, 22.25; grade 3, 21.25; grade 4, 19.75.

Brass Ingot: Red brass, No. 115, 27.25; tin bronze, No. 225, 35.50; No. 245, 29.75; high-leaded tin bronze, No. 305, 30.25; No. 1 yellow, No. 405, 21.50; manganese bronze, No. 421, 24.00.

Magnesium Alloy Ingot: AZ63A, 40.75; AZ91B, 37.25; AZ91C, 40.75; AZ92A, 40.75.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.82, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 32.355; l.c.l., 32.98. Weatherproof, 30,000-lb lots, 33.66; l.c.l., 34.78. Magnet wire deld., 40.43, before quantity discount.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $19.50 per cwt; pipe, full coils, $19.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates, 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.017	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	45.40	51.20
6061-T6	46.90	53.00
2024-T4*	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, 45.20-58.60 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 50.50-66.60 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in. 93.30. Thread plate, .188 in., 71.70; .250-2.00 in., 70.60. Tooling plates, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)
Aluminum: 1100 clippings, 13.00-13.50; old sheets, 10.00-10.50; borings and turnings, 6.50-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	49.13b	46.36c	....	49.32
Yellow Brass	43.02	31.30d	43.56	45.93
Low Brass, 80%	45.50	45.44	46.04	48.31
Red Brass, 85%	46.37	46.31	46.91	49.18
Com. Bronze, 90%	47.78	47.72	48.32	50.34
Manganese Bronze	51.01	45.11	....	....
Muntz Metal	45.39	41.20	....	....
Naval Brass	47.27	41.58	54.33	50.68
Silicon Bronze	53.76	52.95	53.80	55.74e
Nickel Silver, 10%	59.43	....	....	....
Phos. Bronze, A-5%	68.07	68.57	68.57	69.75

SCRAP ALLOWANCES f

	Clean Heavy	Rod Ends	Clean Turnings
Copper	23.000	23.000	22.250
Yellow Brass	17.375	17.125	15.750
Low Brass, 80%	19.500	19.250	18.750
Red Brass, 85%	20.250	20.000	19.500
Com. Bronze, 90%	21.000	20.750	20.250
Manganese Bronze	16.125	15.875	15.375
Muntz Metal	16.375	16.125	15.625
Naval Brass	16.125	15.875	15.375
Silicon Bronze	22.625	22.375	21.625
Nickel Silver, 10%	23.625	23.375	11.813
Phos. Bronze, A-5%	23.750	23.500	22.500

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.00-10.50; industrial castings, 10.00-10.50.

Copper and Brass: No. 1 heavy copper and wire, 18.50-19.00; No. 2 heavy copper and wire, 17.50-18.00; light copper, 15.50-16.00; No. 1 composition red brass, 17.00-17.50; No. 1 composition turnings, 16.50-17.00; yellow brass turnings, 9.50-9.75; new brass clippings, 15.00-16.00; light brass, 10.00-10.50; heavy yellow brass, 11.50-12.00; new brass rod ends, 13.50-14.00; auto radiators, unsweated, 12.50-13.00; cocks and faucets, 13.50-14.00; brass pipe, 14.00-15.00.

Lead: Heavy 9.50-10.00; battery plates, 4.25-4.50; linotype and stereotype, 11.50-12.00; electrotype, 10.00-10.50; mixed babbitt, 11.00-11.50.

Monel: Clippings, 32.00-34.00; old sheets, 30.00-32.00; turnings, 24.00-25.00; rods, 32.00-34.00.

Nickel: Sheets and clips, 55.00-60.00; rolled anodes, 55.00-60.00; turnings, 45.00-50.00; rod ends, 55.00-60.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.00-17.50; 3003 clippings, 17.00-17.50; 6151 clippings, 16.50-17.50; 5052 clippings, 16.50-17.00; 2014 clippings, 16.00-17.00; 2017 clippings, 16.00-17.00; 2024 clippings, 16.00-17.00; mixed clippings, 15.50-16.00; old sheets, 13.50; old cast, 13.50; clean old cable (free of steel), 16.50; borings and turnings, 14.00-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 53.00; light scrap, 48.00; turnings and borings, 33.00.

Copper and Brass: No. 1 heavy copper and wire, 20.50; No. 2 heavy copper and wire, 18.75; light copper, 16.50; refinery brass (60% copper) per dry copper content, 17.75.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 20.50; No. 2 heavy copper and wire, 18.75; light copper, 16.50; No. 1 composition borings, 17.75; No. 1 composition solids, 18.25; heavy yellow brass solids, 13.00; yellow brass turnings, 12.00; radiators, 13.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 45.29; oval, 43.50, 5000-10,000 lb; electrodeposited, 35.75, 2000-5000 lb lots; cast, 36.25, 5000-10,000 quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00 Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 111.50; 200-499 lb, 110.00; 500-999 lb, 109.50; 1000 lb or more, 109.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.
Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30, f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 74.80; 300-900 lb, 72.80.

Copper Sulphate: 100-1900 lb, 14.55; 2000-5900 lb, 12.55; 6000-11,900 lb, 12.30; 12,000-22,900 lb, 12.05; 23,000 lb or more, 11.55.

Nickel Chloride: Less than 400 lb, 35.00; 400-9990 lb, 33.00; 10,000 lb, 32.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 74.70; 100-600 lb, 65.80; 700-1900 lb, 63.00; 2000-9900 lb, 61.20; 10,000 lb or more, 59.80.

Stannous Chloride (anhydrous): Less than 25 lb, 164.10; 25 lb, 129.10; 100 lb, 114.10; 400 lb, 111.60; 5200-19,600 lb, 99.40; 20,000 lb or more, 87.20.

Stannous Sulphate: Less than 50 lb, 126.90; 50 lb, 96.90; 100-1900 lb, 94.90; 2000 lb or more, 92.90.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

PROCESS EQUIPMENT ENGINEER

To prepare process flow diagrams and equipment specifications for raw materials handling and iron and steel production facilities.

Some engineering experience required, preferably in a metallurgical industry. Operating experience desirable. Engineering degree required.

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ARTHUR G. McKEE & Co.
2300 Chester Ave., Cleveland 1, Ohio
Telephone TO-1-2300

CLASSIFIED

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Help Wanted

FOUNDRY SUPERINTENDENT for jobbing foundry in New England producing carbon, low alloy and stainless castings. Must have practical and technical background, be cost minded and be able to assume responsibility. In reply include complete resume giving experience, background, availability, age, salary expected, etc. Reply to Box 594, STEEL, Penton Bldg., Cleveland 13, Ohio.

ASST. WORKS MGR. FOR EXPANDING MEDIUM sized plant in N. E. Pa. Desire young but mature man with engineering degree and experience in ferrous foundries, sheet metal fabrication and machining. Reply Box 593, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

NINE YEARS EXPERIENCE IN MACHINE DESIGN, Plant work, structural steel, sales engineering (three years traveling), and engineering supervision. Also a degree in Industrial Engineering. Write Box 579, STEEL, Penton Bldg., Cleveland 13, Ohio.

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By checking the classified pages of STEEL each week you'll be able to find many different types of equipment which will fit your requirements. Used or surplus equipment—you can best find it in STEEL'S classified columns.

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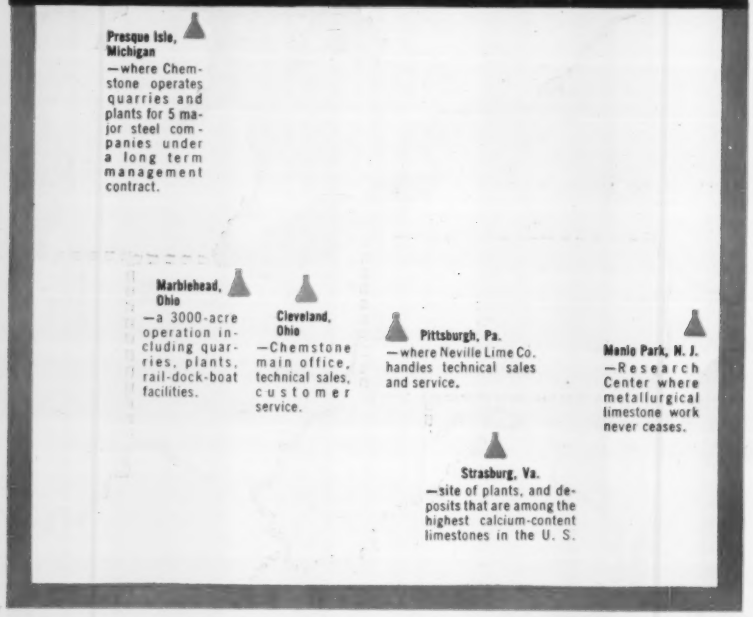
Progressive New Jersey organization has opening in supervision for experienced Drop Forge Foreman. Must be familiar with all phases of steam and board hammer operation. Top salary to qualified individual. All employee benefits. Write giving full details in first letter.

McWILLIAMS FORGE CO., INC.
FRANKLIN ROAD
ROCKAWAY, N. J.

Here's a good picture to back up your fluxstone needs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—where Chemstone operates quarries and plants for 5 major steel companies under a long term management contract.
Marblehead, Ohio
—a 3000-acre operation including quarries, plants, rail-dock-boat facilities.
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—where Neville Lime Co. handles technical sales and service.
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—Research Center where metallurgical limestone work never ceases.
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—site of plants, and deposits that are among the highest calcium-content limestones in the U. S.

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1. Dependable Deliveries—Chemstone is big, in ratio to steel itself. Multi-plant set-up, great capacity, integrated shipping facilities mean fast, sure deliveries to meet steel mill schedules.
2. Finest Quality Fluxstone—noted for uniformity of size, strict adherence to specifications, controlled top quality that is time-honored in the trade.
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Chemstone—and its parent company, Minerals & Chemicals Corporation of America—is geared to give steelmakers full service. Your inquiry is invited.

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a subsidiary of
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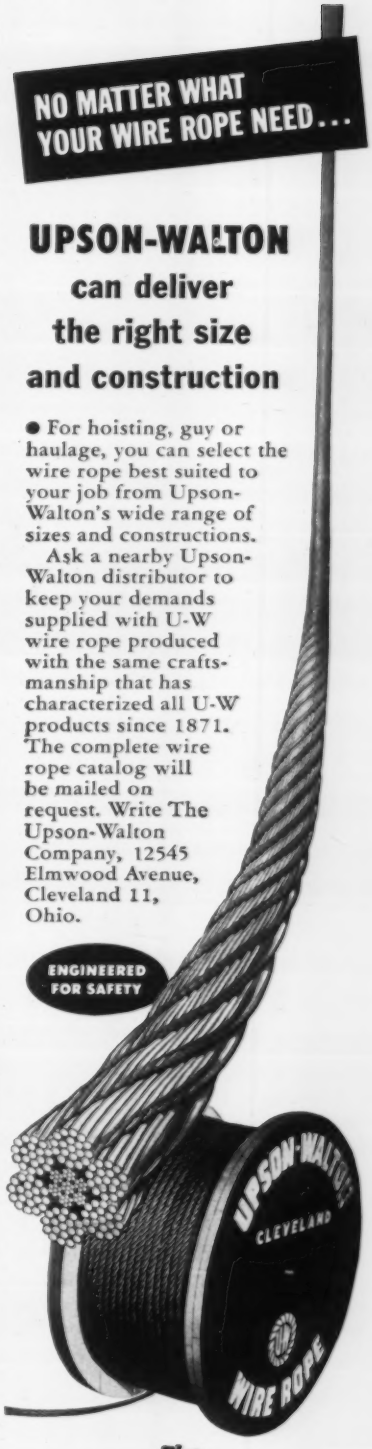

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Farval serves 1133 mill and crane bearings in Atlantic Steel's new bar and rod mill

FARVAL—
Studies in Centralized Lubrication
No. 205

KEYS TO ADEQUATE LUBRICATION—

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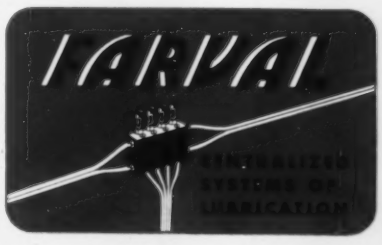
You'll generally find Farval in evidence wherever steel is made or worked. Literally thousands of systems, automatic and manually operated, protect millions of bearings in the metals industries—some of them still efficiently on the job after 25 to 30 years of service.

Farval is the original Dualine system of centralized lubrication that delivers measured amounts of oil or grease under pressure to every bearing as often as desired. No bearing is ever missed.

Write for newly revised Bulletin 26-S, which tells the whole Farval story. The Farval Corporation, 3270 E. 80th St., Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing.
In Canada: Peacock Brothers Limited.



SLABBING MILLS

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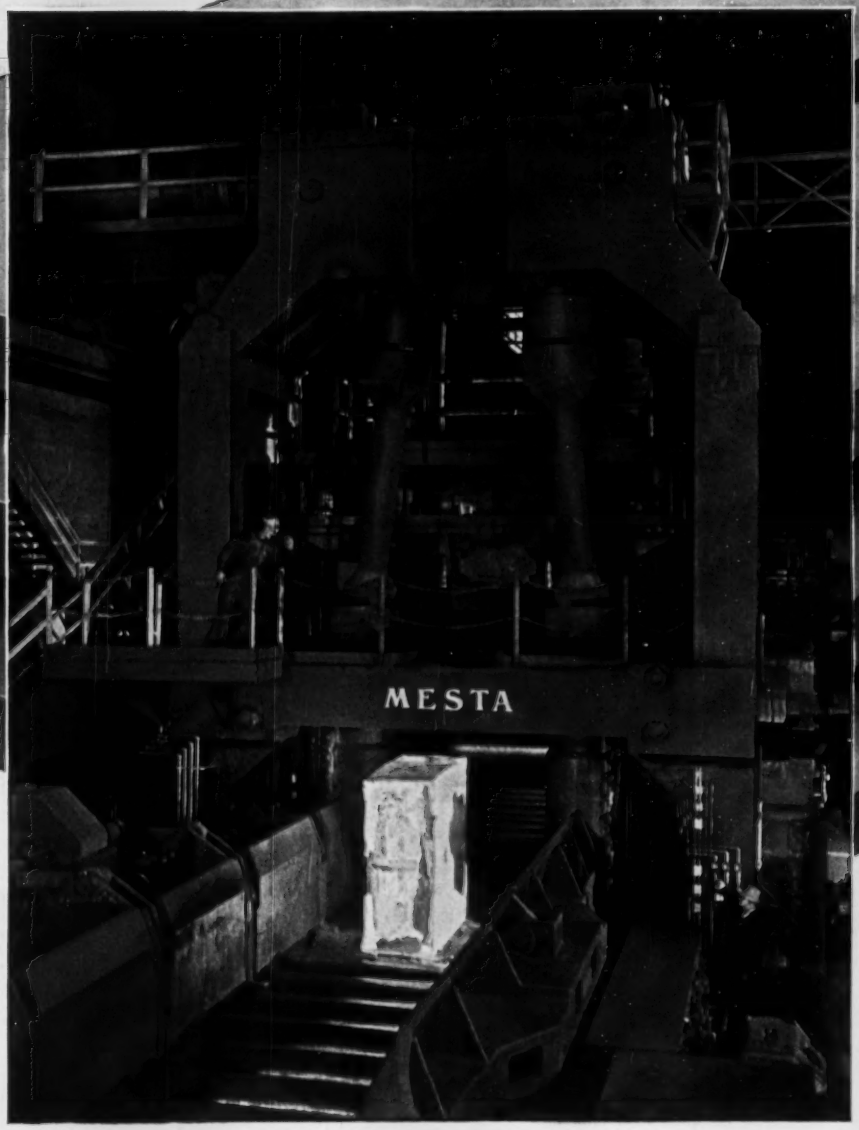

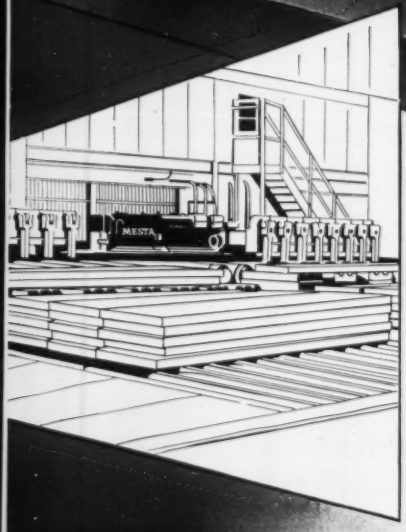

Rolling 20 Ton Ingots into Slabs on a Mesta
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